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DRAFT ENVIRONMENTAL ASSESSMENT

DEVELOPMENT OF ASH MANAGEMENT STRATEGY ALLEN FOSSIL PLANT

Shelby County, Tennessee

TENNESSEE VALLEY AUTHORITY

JUNE 2006

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Proposed project: Development of Ash Management Strategy
Shelby County, Tennessee

Lead agency: Tennessee Valley Authority

Cooperating agencies: Memphis and Shelby County Port Commission

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Abstract: The east pond at the Tennessee Valley Authority (TVA) Allen Fossil Plant (ALF) is an ash easement area used to receive sluiced boiler slag and fly ash. Currently, Reed Minerals reclaims most of the boiler slag and processes it for use in industrial abrasives. Therefore, most of the ash deposited in the east pond is either fly ash or slag fines not reclaimed by Reed Minerals. This pond is required to maintain 158,400 cubic yards of free water volume (FWV) in order to comply with its National Pollutant Discharge Elimination System (NPDES) permit conditions. In order to maintain this volume, it has been necessary to construct a temporary dredge cell within this pond to receive ash dredged from the rest of the pond. Dredged ash is being reclaimed from the dredge cell for other small structural fill projects in the vicinity of the plant. This process currently works, but the dredged cell could fill up within the next 24 months. TVA must decide whether (1) to continue to send the ash generated at ALF to the east pond on easement property, which is nearing capacity, or (2) to develop a different strategy for management of the ash. In this Environmental Assessment, TVA has considered six alternatives for utilization or disposal of the ash.

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CHAPTER 1

1. PURPOSE OF AND NEED FOR ACTION

The east pond at the Tennessee Valley Authority (TVA) Allen Fossil Plant (ALF) is an ash easement area used to receive sluiced boiler slag and fly ash. Currently, Reed Minerals reclaims most of the boiler slag and processes it for use in industrial abrasives. Therefore, most of the ash deposited in the east pond is either fly ash or slag fines not reclaimed by Reed Minerals. This pond is required to maintain 158,400 cubic yards ($yd^{3)}$ of free water volume (FWV) in order comply with its National Pollutant Discharge Elimination System (NPDES) permit conditions. In order to maintain this volume, it has been necessary to construct a temporary dredge cell within this pond to receive ash hydraulically dredged from the rest of the pond. Dredged ash is being reclaimed from the dredge cell for other small structural fill projects in the vicinity of the plant. This process works currently, but the dredge cell could fill up within the next 24 months.

1.1. The Decision

Tennessee Valley Authority (TVA) must decide whether to (1) continue the status quo for managing the ash generated at ALF to the east pond on easement property which is nearing capacity or (2) develop a different strategy for management of the ash.

1.2. Other Pertinent Environmental Reviews or Documentation

National Environmental Policy Act (NEPA) documents related to the Development of Ash Strategy or the operation of ALF are:

- Coal Combustion Byproduct Marketing/Utilization and Listing of Approved Uses Environmental Assessment and Finding of No Significant Impact (TVA, 1990)
- Allen Fossil Plant, Dewatering Active Ash Pond to Reclaim Ash Material for Ensley Berm Project Environmental Decision Record PR PROD 91-150 (TVA, 1991a)
- Amendment to Environmental Assessment - Coal Combustion Byproduct Marketing - Use of Fly Ash and Bottom Ash in Structural Fills for Residential or Commercial Structures Environmental Decision Record PR PROD 91-153 (TVA, 1991b)
- Categorical Exclusion Checklist (CEC) 7522, Allen Fossil Plant Temporary Ash Dredge Cell (TVA, 2004)
- CEC 9555 Memphis Belz Structural Fill (TVA, 2005)
- Development of Additional Ash Disposal Environmental Assessment for the Bull Run Steam Plant (TVA, 1981)
- Development of Dredged Ash Disposal Area Environmental Impact Statement for the Johnsonville Fossil Plant (TVA, 1989a)

- Development of Dredged Ash Disposal Area Environmental Assessment for the Paradise Fossil Plant (TVA, 1989b)

- Development of Ash Disposal Capacity Environmental Assessment for the Paradise Fossil Plant (TVA, 1996a)

- Sale of Permanent Easements and Temporary Construction Easements on TVA Tracts XALSP-2H and XALSP-3RR to the City of Memphis, Shelby County, Tennessee - Adoption of the Environmental Assessment Prepared by the U.S. Army Corps of Engineers, Memphis District, and Finding of No Significant Impact (TVA, 1996b)

- Birmingham Steel Corporation Mini-Steel Mill and Memphis Shelby County Port Commission Harbor Project - Proposed Economic Development Loans and Direct Electrical Service - Adoption of the Environmental Assessment Prepared by the U.S. Army Corps of Engineers, Memphis District, and Finding of No Significant Impact (TVA, 1996c)

- Allen Fossil Plant Biogas Fuel Supplement Project Environmental Assessment and Finding of No Significant Impact (TVA, 2000)

- Allen Fossil Plant Units 1, 2, and 3 Selective Catalytic Reduction Systems for Nitrogen Oxide Control Environmental Assessment, Revised Environmental Assessment, and Finding of No Significant Impact (TVA, 2001)

- Development of Long-Term Ash Management Strategy, Johnsonville Fossil Plant, Kentucky Reservoir, Humphreys County (TVA, 2002)

1.3. The Scoping Process

A TVA interdisciplinary team reviewed the potential direct, indirect, and cumulative effects of Alternative A (the No Action Alternative), continuing to send the ash generated at ALF to the east pond, and the Action Alternatives, Alternatives B through F. Figure 1-1 shows the affected areas for this project.

Figure 1-1. Development of Ash Management Strategy Area Map

1.4. Necessary Federal Permits or Licenses

Actions involving wetlands and/or stream crossings would be subject to Federal Section 404 Clean Water Act permit requirements as well as state Section 401 water quality certification.

A construction general permit would need to be obtained prior to commencement of construction for Areas 1 through 4.

A Prevention of Significant Deterioration (PSD) Permit application demonstrating that PSD limits would not be exceeded would be submitted to Memphis and Shelby County Air Pollution Control in order to obtain a permit prior to commencement.

Discharge from Area 1 would require a NPDES permit modification if discharged directly to McKellar Lake.

Discharge from Area 3 would require NPDES permit modification. However, if pumped back to the active ash pond, a 6 month advance notification to the state is required.

A Solid Waste Disposal Permit/Permit-by-Rule for ash disposal/utilization would be required for the utilization of ash in Area 2 and/or Area 3.

CHAPTER 2

2. ALTERNATIVES INCLUDING THE PROPOSED ACTION

This chapter describes the No Action and Action Alternatives and summarizes the environmental consequences of each alternative.

2.1. Alternatives

There are six alternatives discussed and evaluated in this Environmental Assessment (EA): the No Action Alternative (Alternative A) and five Action Alternatives (Alternatives B through F). Table 2-1 shows the ash available to be utilized in the five Action Alternatives.

Table 2-1. Allen Fossil Plant Ash Availability for Utilization Projects

Source of Ash	Available Ash Volume (yd^3)	Achievable Pond Capacity Volume (yd^3)
east pond (active pond) stockpiled outside of dredge cell	148,900	N/A
east pond cleanout (active pond) 10 feet below water	1,144,979	876,992
east pond cleanout (active pond) 15 feet below water	1,665,340	1,408,150
east pond (active pond) cleanout 20 feet below water	2,185,640	1,926,518
west pond cleanout 10 feet below surface (excludes laydown area)	75,826	110,285
west pond cleanout 15 feet below surface (excludes laydown area)	139,038	173,497
west pond cleanout 20 feet below surface (excludes laydown area)	198,020	232,479
west pond cleanout 10 feet below surface (includes laydown area)	183,513	202,135
west pond cleanout 15 feet below surface (includes laydown area)	301,090	319,712
west pond cleanout 20 feet below surface (includes laydown area)	412,093	430,714

Notes:
1. Volumes are based upon survey data: east pond survey date = 3/29/05; west pond survey date = 5/20/04.
2. Pond cleanout assumptions:
   a. Offset 20 feet from the inside top of dike.
   b. Cleanout at a 2:1 interior slope.
   c. Cleanout depths start at the water surface elevation on the east pond, and the laydown surface elevation on the west pond.
   d. No material would be cleaned out of the final stilling pond in the east pond.
3. The pond bottom design elevation for both the east and the west ponds is approximate elevation 212.

2.1.1. Alternative A – The No Action Alternative

Under Alternative A, the No Action Alternative, TVA would continue to send the ash to the east pond at ALF, and dredge this ash into a small dredge cell to be reclaimed from time-to-time for small ash utilization projects. The No Action Alternative would eventually lead to environmental compliance issues. If ash storage capacity is depleted, ALF could not operate in compliance with its existing NPDES permit.

2.1.2. Alternative B – Alternative B-1, Develop Fill Area 1 as a New Ash Pond, and Sluice Fly Ash as Produced to the Area; Alternative B-2, Develop Fill Area 1 as a Dredge Cell, Hydraulically Dredge Fly Ash From the East Ash Pond

Under Action Alternative B-1, TVA would construct clay dikes around Fill Area 1 to isolate the fill area from the 100-year flood elevation. The fly ash sluice lines would be re-directed from the east ash pond to Fill Area 1. The discharge from the pond could either be permitted as a new NPDES discharge to McKellar Lake or the water could be pumped back to the east ash pond for discharge through the current NPDES-permitted discharge. Boiler slag would continue to be sluiced to the east pond where Reed Minerals would reclaim and process the material.

Action Alternative B-2 would develop Fill Area 1 with clay dikes as described above, but instead of sluicing fly ash directly to the area, ash would continue to be directed to the east ash pond, but then would periodically be dredged from the east ash pond to Fill Area 1 using a hydraulic dredge. Dredge sluice water could either be pumped back to the east ash pond for discharge through the current NPDES-permitted discharge or discharged through a new NPDES discharge to McKellar Lake. As is the current practice, this option would allow for ash also to be dredged into the dredge cell in the east ash pond if needed. This option would also allow the processor to continue reclaiming and processing of boiler slag within the east ash pond.

In the event that Alternative B-1 or B-2 was pursued, a borrow site would be identified and the environmental impacts of developing the borrow site and the truck traffic associated with hauling the borrow material for dike construction would be assessed.

2.1.3. Alternative C – Develop Fill Area 2 as a Structural Fill to Support Intermodal Transfer in Pidgeon Industrial Park

Alternative C involves the use of approximately (~) 2 million yd^3 of ash to construct an intermodal freight transfer facility inside the Ensley Levee associated with the Pidgeon Harbor installation. The property under consideration is under the control of the Memphis and Shelby County Port Commission (Port Commission); the Port Commissioner has agreed to use ash to develop the site as an intermodal freight transfer facility, which is in alignment with the Port Commission's master plan for this property. A benefit to Alternative C is that it would utilize the ash for development of a structure that contributes to the infrastructure of the Pidgeon Industrial Park. Use of ash in this development project would avoid the need to excavate and transport at least 2 million yd3 of "borrow" soil that would otherwise be needed to construct the intermodal freight transfer facility.

Under this alternative, ash may be removed from both the inactive west ash pond and active east ash pond and the associated temporary dredge cell at ALF. Ash would be reclaimed from these disposal areas, dewatered, loaded onto trucks, and hauled for placement and compaction within Area 2. Plant operation would be sustained by continued sluicing, with potential reactivation of sluicing operations to the west pond to improve the efficiency of ash reclamation activities. Before the west pond could be used, new discharge lines would have to be installed. This would involve disturbing (digging up) the land from the west pond over to the discharge canal. After each stage of construction in Area 2, segments that have reached final contours would receive interim cover to prevent erosion. Fill Area 4 has been used by the Port Commission for disposal of dredged spoil material. TVA proposes that spoil from this site be used as cover material for vegetation of disturbed

sections in Area 2. Upon completion of all stages of Area 2, the impacted area would receive final cover consistent with permit requirements and good engineering practices.

2.1.4. Alternative D – Alternative D-1, Develop Fill Area 3 as a New Ash Pond, and Sluice Fly Ash as Produced to the Area; Alternative D-2, Develop Fill Area 3 as a Dredge Cell, Hydraulically Dredge Fly Ash From the East and or West Ash Pond(s) to Support Development Associated With the Pidgeon Harbor Installation

Under Alternative D-1, TVA would construct clay dikes around Fill Area 3 on the low sides of Fill Area 3 to isolate the fill area from the 100 year flood elevation and to create a large dredge cell. The existing Ensley Levee would contain Fill Area 3 on the other two sides. The fly ash sluice lines would be re-directed from the east and/or west ash pond (s) to Fill Area 3. The discharge from the pond could either be permitted as a new NPDES discharge to McKellar Lake or the water could be pumped back to the east ash pond for discharge through the current NPDES-permitted discharge. Boiler slag would continue to be sluiced to the east pond where Reed Minerals would reclaim and process the material. Fill Area 4 has been used by the Port Commission for disposal of dredged spoil material. TVA proposes that spoil from this site be used as cover material for vegetation of disturbed areas in Area 3.

Action Alternative D-2 would develop Fill Area 3 with clay dikes as described above, but instead of sluicing fly ash directly to the area, ash would continue to be directed to the east ash pond, but would periodically be dredged from the east and/or west ash pond to Fill Area 3 using a hydraulic dredge. Dredge sluice water could either be pumped back to the east or west ash pond for discharge through the current NPDES-permitted discharge or discharged through a new NPDES discharge to McKellar Lake. Before the west pond could be used new discharge lines would have to be installed. This would involve disturbing (digging up) the land from the west pond over to the discharge canal. As is the current practice, this option would allow for ash also to be dredged into the dredge cell in the east ash pond if needed. This option would also allow the processor to continue reclaiming and processing of boiler slag within the east ash pond.

In the event that Alternative D were pursued, a borrow site would be identified and the environmental impacts of developing the borrow site and the truck traffic associated with hauling the borrow material for dike construction would be assessed.

2.1.5. Alternative E – Dredge the East Ash Pond and Haul the Ash to a Commercial Municipal Solid Waste Landfill

Under Alternative E, fly ash within the east ash pond would be hydraulically dredged into the existing temporary dredge cell within the pond. Each time the dredge cell reached capacity [~260,000 yd^3], it would be dewatered and the dredged ash would be excavated, dried and hauled to an off-site commercial municipal solid waste landfill for disposal. The landfill being considered is the Waste Management landfill located near Tunica, Mississippi. This landfill is located within 30 miles of ALF. If this option were chosen, it would be necessary to dredge, dewater, excavate and haul material from the dredge cell on an approximately two-to three-year cycle in order to maintain compliance with the NPDES-required FWV in the east ash pond.

2.1.6. Alternative F – Combination of the Action Alternatives B Through E

Alternative F would be a combination of two or more of the above Alternatives B through E.

2.2. Comparison of Alternatives

The comparison of potential impacts for Alternatives A through E is presented in Table 2-2. Alternative F is not included in Table 2-2 because Alternative F is a combination of two or more of Alternatives B through E compared in the table. The environmental impacts of Alternative F would be less than or equal to those of the other alternative(s) having the greatest potential for impacts.

Table 2-2. Comparison of Alternatives

Resource Area	Alternative A (No Action)	Alternative B (Develop Fill Area 1)	Alternative C (Develop Fill Area 2)	Alternative D (Develop Fill Area 3)	Alternative E (Off-Site Disposal)
Air	None	Land clearing, site preparation, and vehicular traffic over unpaved roads and construction sites result in the emission of fugitive dust particulate matter (PM) during site preparation and active construction periods Minimal local emissions of PM, nitrogen oxides (NOx), carbon monoxide, volatile organic compounds (VOCs), and sulfur dioxide; with use of best management practices (BMPs), this would be insignificant	Land clearing, site preparation, and vehicular traffic over unpaved roads and construction sites result in the emission of fugitive dust PM during site preparation and active construction periods Minimal local emissions of PM, NOx, carbon monoxide, VOCs, and sulfur dioxide; with use of BMPs, this would be insignificant	Land clearing, site preparation, and vehicular traffic over unpaved roads and construction sites result in the emission of fugitive dust PM during site preparation and active construction periods Minimal local emissions of PM, NOx, carbon monoxide, VOCs, and sulfur dioxide; with use of BMPs, this would be insignificant	Dust control due to truck traffic; with use of BMPs, this would be insignificant Minimal local emissions of PM, NOx, carbon monoxide, VOCs, and sulfur dioxide; with use of BMPs, this would be insignificant
Surface Water	Eventual noncompliance with the FWV requirement in the NPDES permit Discharging waters of degraded quality from the east ash pond outfall	Erosion; effluent contaminants; with use of BMPs, this would be insignificant	Erosion; effluent contaminants; with use of BMPs, this would be insignificant	Erosion; effluent contaminants; with use of BMPs, this would be insignificant	Erosion; effluent contaminants; with use of BMPs, this would be insignificant
Groundwater	None	Negligible impacts	Negligible impacts	Negligible impacts	None

Resource Area	Alternative A (No Action)	Alternative B (Develop Fill Area 1)	Alternative C (Develop Fill Area 2)	Alternative D (Develop Fill Area 3)	Alternative E (Off-Site Disposal)
Terrestrial Ecology	Reduced use by waterfowl and wading birds; however, there are other available areas for waterfowl and wading birds in this general location	None	May affect bald eagle nesting in the area	Habitat removed for the only known breeding population of painted buntings in Tennessee May affect bald eagle nesting in the area	None
Aquatic Ecology	Runoff from east ash pond to McKellar Lake would potentially adversely affect aquatic resources in McKellar Lake and the Mississippi River	Degradation of blue sucker habitat could result from runoff from the east pond or from soil-disturbing activities; with use of BMPs, this would be insignificant	Degradation of blue sucker habitat could result from runoff from the east pond or from soil-disturbing activities; with use of BMPs, this would be insignificant	Degradation of blue sucker habitat could result from runoff from the east pond or from soil-disturbing activities; with use of BMPs, this would be insignificant	None
Wetlands	None	Filling of wetland (W1) in Area 1	None	None	None
Floodplains	None	Constructed within the limits of the Mississippi River 100-year floodplain	None	Constructed within the limits of the Mississippi River 100-year floodplain	None
Solid Waste	Limited storage capacity that does not meet the purpose and need for storage capacity at ALF	Limited storage capacity that does not meet the purpose and need for storage capacity at ALF; would need to be used in conjunction with another alternative	Contributes to infrastructure of Pidgeon Industrial Park	Limited storage capacity that does not meet the purpose and need for storage capacity at ALF; would need to be used in conjunction with another alternative	Insignificant impacts with implementation of BMPs and disposal at a controlled and permitted landfill Economically expensive
Cultural Resources	None	None	None	None	None
Farmland	None	None	Insignificant amount; 15 acres of land with prime farmland properties would be affected	Insignificant amount; 30 acres of land with prime farmland properties would be affected	None
Natural Areas	None	None	None	None	None
Visual	None	Insignificant change in topography from creation of the dikes	Motorists would have brief views of minimal visual discord	Motorists would have brief views of minimal visual discord	Minor visual discord associated with an increase in heavy truck traffic
Seismology	None	Potential earthquake impacts depending on	Potential earthquake impacts depending on	Potential earthquake impacts depending on	None

Resource Area	Alternative A (No Action)	Alternative B (Develop Fill Area 1)	Alternative C (Develop Fill Area 2)	Alternative D (Develop Fill Area 3)	Alternative E (Off-Site Disposal)
		design criteria	design criteria	design criteria	
Socio-economics and Environ-mental Justice	None	Negligible impacts	Contributes to future planned use of the harbor as a facility for intermodal transportation	Contributes to future planned use of the harbor as a facility for intermodal transportation	Negligible impacts
Transporta-tion	None	Since the site is currently almost inaccessible to truck traffic, construction of a haul road to the site would be required	Minor traffic impacts	Minor traffic impacts	Minor traffic impacts

2.3. The Preferred Alternative

TVA's preferred alternative is Alternative C, Develop Fill Area 2. Alternatives C, E and F are the options under consideration that would allow ALF to continue operation in compliance with its current NPDES permit and significantly extend the use of the existing plant ash disposal facilities. Hauling ash to a commercial municipal landfill (Alternative E) would not be the preferred alternative, primarily because of cost. Total cost for this option would be over $5 million per year and would only be economical as a short-term emergency option in the event that Alternative C were delayed for some reason. Preliminary cost studies indicate that Alternative F would also be more costly than the single action considered for Alternative C due to the costs of permitting, constructing and operating multiple sites.

Regardless of which alternative selected, TVA plans to continue to pursue the use of ALF ash for small structural fill development projects whenever economically feasible. Such projects, when identified, would be reviewed for site specific environmental impacts utilizing a Categorical Exclusion Checklist (CEC) and would tier from this EA.

CHAPTER 3

3. AFFECTED ENVIRONMENT

TVA personnel from ALF, Coal Combustion Byproducts, Environmental Affairs, Communication and Government Relations, Fossil Engineering, and the NEPA Administration Environmental Core Team conducted a preliminary examination of the scope of this project. This section identifies and discusses issues of environmental concern and their potential for impacts.

3.1. Air

The air quality in the vicinity of ALF is generally good, with the area in compliance with all air quality standards except the 8-hour ozone standard. Regionally, air quality is also generally good. All areas in Tennessee have achieved attainment with the old 1-hour ozone standard. However, for some areas, attainment of the 8-hour ozone standard of 80 parts per billion has been more difficult to achieve. In addition, some areas of the region, including Shelby County, could experience difficulty in maintaining attainment with the recently adopted annual $PM_{2.5}$ standard (particulate matter with a diameter less than or equal to 2.5 micrometers).

3.2. Surface Water

Fill Areas 1 and 3 are both located outside of the Ensley Levee and entirely within the 100-year floodplain of the Mississippi River. The Mississippi River 100-year floodplain elevation in the area is ~225 feet. The elevation of Area 1 varies from about 200 to 210 feet, and the elevation of Area 3 varies from about 210 to 225 feet. Surface drainage from Area 1 drains to McKellar Lake, which flows into the Mississippi River, and Area 3 drains directly to the Mississippi River.

Both McKellar Lake and the Mississippi River in Shelby County are impacted water bodies that are not supporting designated uses according to the Tennessee Department of Environment and Conservation (TDEC), 2002 Both water bodies are similarly listed in TDEC, 2004. Specific parameters for which both water bodies are listed as impaired are polychlorinated biphenyls (PCBs), dioxins, chlordane, and siltation. Additional causes of impairment for McKellar Lake are organic enrichment/low-dissolved oxygen, and pathogens, and for the Mississippi River, additional causes of impairment are nitrate and other habitat alterations.

Fill Areas 2 and 4 are both located inside the levee. The current elevation at these locations is ~210 feet. Surface drainage from these areas would generally drain toward the lowest point inside the levee, which is a relatively flat area with no discernable discharge. No perennial streams are located in the vicinity of Areas 2 and 4.

3.3. Groundwater

The study area resides within the Mississippi Alluvial Plain subdivision of the Coastal Plain Physiographic Province, an area characterized by flat to gently rolling floodplain terrain bordered on the eastern side by steep loess bluffs. Structurally, the area lies near the

center of the upper portion of the Mississippi Embayment, a broad southward-plunging syncline with its axis approximately aligned with the course of the Mississippi River. The syncline consists of several thousand feet of relatively unconsolidated cretaceous, tertiary, and quaternary age deposits of clay, silt, sand, gravel, chalk, and lignite. The principal aquifers of this sedimentary sequence include (in descending order), recent alluvium, the Memphis sand, and the Fort Pillow sand.

Exploratory drilling at the ALF site and the Pidgeon Industrial Park located south of the plant indicates the alluvial aquifer ranges from 100 to 136 feet in thickness (Beard, 1989; Hall, Blake, and Associates, 1991). The upper portion of the alluvial deposits generally consists of deposits of fine sand, silt, and clay; whereas, the basal portion is composed of coarser sand and gravel. Alluvial sediments typically occur in discontinuous lenses and layers and exhibit a high degree of heterogeneity. Recharge occurs primarily by surface infiltration of rainfall. Shallow groundwater movement in the study area is generally toward surface water discharge points. Well monitoring since 1988 indicates groundwater movement in the alluvial aquifer beneath the plant site is generally northward to McKellar Lake, with 10 to 15 feet overall seasonal variations in water level. Depth to groundwater is generally 10 to 30 feet below ground surface. Groundwater originating at proposed Fill Area 1, located on the peninsula just north of the plant, also flows to McKellar Lake. Given the proximity of Fill Areas 2 through 4 to the Mississippi River, shallow groundwater present beneath these areas would be expected to flow westward to the river. During flood conditions, hydraulic gradient reversals occasionally occur resulting in temporary recharge of the alluvial aquifer from adjacent surface water bodies. The alluvial aquifer typically provides water for domestic, irrigation, and industrial supplies in the Memphis area. However, there are no known water supply wells completed in the alluvial aquifer within at least 1 mile of the study area (Hall, Blake, and Associates, 1991).

The alluvial aquifer is separated from the deeper Memphis sand aquifer by a clay aquitard associated with the Jackson and Upper Claiborne formations. Overall thickness of the Jackson clay varies from 0-360 feet regionally. Several deep borings completed at the ALF site encountered Jackson aquitard at depths between 114-144 feet, although none fully penetrated the unit. Aquitard penetrations ranged from 4-40 feet and generally indicated the formation consists of silty clay with occasional thin lenses of silt, sand, lignite, and gravel.

The Memphis sand is a major regional aquifer and is the source of municipal water for the City of Memphis. The aquifer primarily consists of fine-to-coarse sand with isolated lenses of clay and silt. Thickness ranges from 500-900 feet regionally. Recharge occurs at the aquifer outcrop area in western Tennessee and, to a lesser extent, from influx of groundwater from overlying formations. Regional groundwater movement is generally westward toward the axis of the Mississippi Embayment. However, a large cone of depression has formed around the city due to withdrawals from numerous water supply wells completed in this aquifer in Memphis and neighboring areas of Shelby County.

The Memphis sand is separated from the underlying Fort Pillow aquifer by 0-310 feet of clay, silt, and sand sediments of the Flour Island aquitard. The Fort Pillow aquifer is not widely used in the Memphis region because of the availability of shallower groundwater resources.

3.4. Terrestrial Ecology

3.4.1. Wildlife

Due to the activities associated with the fossil plant and nearby industrial complex, many of the habitats within the study area have been modified. However, wildlife habitat does exist in the project area. The study area consists primarily of early successional habitats, including fallow fields and agricultural fields interspersed with thickets and hardwood forests. No caves were noted in the study area. Early successional habitats account for ~76 percent of the project area. These habitats are densely vegetated with grasses, shrubs, vines, and occasional thickets with small trees. During field investigations, Carolina wrens, blue-gray gnatcatchers, brown thrashers, white-eyed vireos, yellow-breasted chats, common yellowthroats, indigo buntings, painted buntings, northern cardinals, blue grosbeaks, eastern towhees, and many other birds were encountered using this habitat. The larger trees in these areas provide habitat for red-tailed hawks, red-shouldered hawks, American kestrels, Baltimore orioles, and other birds. Areas dominated by grasses were used by killdeer, northern bobwhite, grasshopper sparrow, dickcissel, eastern meadowlark, and horned lark. Six-lined racerunners, coyotes, and white-tailed deer were also observed in the area.

Approximately 1 percent of the project area consists of cotton fields. This habitat provides little wildlife benefit.

Approximately 23 percent of the project area consists of second-growth bottomland hardwood forests. Older bottomland forests occur within the ALF site but for the most part do not occur within the fill areas. Bottomlands with dense stands of black and sandbar willows are used by willow flycatchers, eastern kingbirds, common yellowthroats, and red-winged blackbirds. Bottomlands with larger and more diverse species of trees, shrubs, and vines supported a greater diversity of wildlife. During field investigations, red-tailed hawks, yellow-billed cuckoos, downy and pileated woodpeckers, eastern wood pewees, American crows, blue jays, Carolina chickadees, eastern tufted titmice, wood thrushes, prothonotary warblers, and other species were encountered using this habitat type. Large cottonwood trees in these areas provide nesting habitat for protected species of birds (see the threatened and endangered section). Bottomland forests with standing water provide habitat for a variety of amphibians and reptiles. Bullfrogs, cricket frogs, and American toads were encountered during field investigations. Cottonmouths and many species of water snakes may occur in large numbers in riparian zones within bottomland forests. Bobcats, raccoons, coyotes, and deer also use these areas.

Ponds and slow-moving streams were noted in the study area. These sites provide habitat for wading birds, shorebirds, and waterfowl that are frequently found in the vicinity. A heron colony comprised mostly of great blue herons exists in Shelby County.

The four sites examined for potential fill areas consisted mostly of early successional habitats. The exception was Area 3, which contained a mixture of all habitats discussed above. Areas 2 and 4 have been spoil disposal sites in previous years, and have largely reverted to early successional habitats. Area 1 is dominated by early successional habitats and is subject to periodic flooding due to its proximity to the Mississippi River.

3.4.2. Plants

The proposed ash management project at ALF occurs in Shelby County, Tennessee, which is located in the Lower Mississippi Riverine Forest Province (Bailey, 1995). The province consists of flat to gently sloping broad floodplain and low terraces made up of alluvium and loess. From near sea level in the south, altitude increases gradually to about 660 feet in the north. Most of the area is flat, with an average southward slope of less than 8 inches per minute. The only noticeable slopes are sharp terrace scarps and natural levees that rise sharply to several meters above adjacent bottomlands or stream channels.

Before cultivation, this area was covered by bottomland deciduous forest with an abundance of green and Carolina ash, elm, cottonwood, sugarberry, sweetgum, and water tupelo, as well as oak and baldcypress. Pecan is also present, associated with eastern sycamore, American elm, and roughleaf dogwood. Vines are prolific along watercourses.

Existing plant communities observed within the four fill areas include bottomland hardwood forests, agricultural lands, and ruderal to early successional habitats. The total acreage of the four areas is almost 255 acres, with Area 1 at ~70 acres; Area 2 at ~95 acres; Area 3 at ~70 acres; and Area 4 at ~20 acres. Ruderal/early successional habitat account for ~76 percent of the project area and can be found along roadside rights-of-way, waste areas, and highly disturbed habitats. Bottomland hardwood forests make up ~23 percent of the total area and are usually associated with low-lying areas subject to flooding. The remaining 1 percent are agricultural lands planted with cotton and fallow fields. See Table 3-1 for a breakdown of the community types by area.

Ruderal/early successional habitat (76 percent) is found extensively in all four areas. Many weedy native and nonnative species occur within this community.

Bottomland hardwood forests (23 percent) contain eastern cottonwood, hackberry, silver maple, green ash, box elder, honey locust, black locust, black walnut, black willow, American sycamore, and pecan in the overstory with rough-leaf dogwood, elderberry, swamp privet, red mulberry, and slippery elm in the understory, along with several species of woody vines such as Carolina moonseed, peppervine, rattan vine, gray grape, red grape, muscadine grape, and dutchman's pipe vine.

Agricultural fields (1 percent) were found in Area 4 with both a fallow field as well as a cotton crop. Herbaceous weeds were dominated by Johnson grass, false dandelion, pokeweed, vasey grass, brome grass, and sneezeweed.

Both native and nonnative invasive weedy species were abundant in the proposed areas. Chinese privet, Japanese honeysuckle, and kudzu are nonnative species commonly encountered. In addition, native weedy plants such as ragweed, goldenrod, horse nettle, thistles, and poison ivy were also found. Several species of uncommon weedy species were observed such as puncture vine, camphorweed, clasping coneflower, plains snake cotton, slender snake cotton, and wooly plantain. These weeds are not commonly found in Tennessee but are not considered to be sensitive species.

Table 3-1. Percent Cover of Each Community Type for Areas 1 Through 4 Found at Allen Fossil Plant

Area	Ruderal/Early successional (Percent)	Bottomland Hardwood (Percent)	Agricultural (Percent)
Area 1 (70 acres)	80	20	
Area 2 (95 acres)	95	5	
Area 3 (70 acres)	50	50	
Area 4 (20 acres)	60	25	15
Total Acreage (almost 255 acres)	**76**	**23**	**1**

3.4.3. Threatened and Endangered Species (Animals)

Reviews of the Tennessee and TVA Natural Heritage databases indicated that three federally and state-listed animal species are reported from Shelby County, Tennessee. Fourteen additional state-listed terrestrial animal species have also been reported from the county (Table 3-2).

Table 3-2. Federally and State-Listed Terrestrial Animal Species Reported From Shelby County, Tennessee

Common Name	Scientific Name	Federal Status	State Status
Amphibian			
Barking Tree Frog	*Hyla gratiosa*	-	In Need of Management
Reptiles			
Alligator Snapping Turtle	*Macroclemys temminckii*	-	In Need of Management
Eastern Slender Glass Lizard	*Ophisaurus attenuatus longicaudus*	-	In Need of Management
Northern Pine Snake	*Pituophis melanoleucus melanoleucus*	-	Threatened
Birds			
Bald Eagle	*Haliaeetus leucocephalus*	Listed Threatened	In Need of Management
Barn Owl	*Tyto alba*	-	In Need of Management
Bewick's Wren	*Thryomanes bewickii bewickii*	-	Endangered
Cerulean Warbler	*Dendroica cerulean*	-	In Need of Management
Interior Least Tern	*Sterna antillarum athalassos*	Listed Endangered	Endangered
Lark Sparrow	*Chondestes grammacus*	-	Threatened
Mississippi Kite	*Ictinia mississippiensis*	-	In Need of Management
Swainson's Warbler	*Limnothlypis swainsonii*	-	In Need of Management
Mammals			
Eastern Big-Eared Bat	*Corynorhinus rafinesquii*	-	In Need of Management
Eastern Woodrat	*Neotoma floridana illinoensis*	-	In Need of Management
Indiana Bat	*Myotis sodalist*	Listed Endangered	Endangered
Southeastern Shrew	*Sorex longirostris*	-	In Need of Management
Invertebrates			
Striped Whitelip (Snail)	*Triodopsis multilineata*	-	Listed by the Tennessee Heritage Program- No Status Assigned

Barking tree frogs are found in wet woodlands, shallow ponds, and cypress or sweetgum swamps in Tennessee. They may occur within bottomland forests found within the project area.

Alligator snapping turtles are typically found in deep water of large rivers and their major tributaries, but these turtles also can be found in lakes, ponds, and swamps (Ernst, Lovich, and Barbour 1994). They have been found in the Mississippi River and, therefore, it is highly probable that they would occur in nearby Lake McKellar, which is a tributary to the Mississippi River.

Eastern slender glass lizards are found in a variety of habitats within their range including dry grasslands, wooded areas, oak savannas, sand prairies, old fields, and pine barrens. Suitable habitat for this species occurs in the study area.

Northern pine snakes inhabit well-drained sandy or loamy soils and dense vegetation. They are known to use disturbed habitats. The sandy soils found in the proposed project site offer ideal habitat where dense vegetation occurs.

Bald eagles typically nest near large bodies of waters including lakes, rivers, and riparian wetlands. Bald eagles have unsuccessfully attempted to nest at several sites adjacent to and within the project area. Eagles maintained a nest in Area 3, but the nest was abandoned in 2001. This nest site was not found during field surveys in 2005. Local birders reported that the pair of eagles built a second nest ~1,600 feet north of Area 2. This nest was abandoned in 2004 and was taken over by great horned owls in 2005. Biologists noted that this nest had fallen from the tree during summer 2005. No other active bald eagle nests are known from the vicinity. In addition to blocks of hardwood trees northwest of the project site, individual cottonwood trees on Area 3 represent suitable bald eagle-nesting habitat.

Barn owls nest in cavities including caves, hollow trees, barns, and silos. They forage over open landscape such as abandoned farmland but also in urban habitat such as vacant lots, cemeteries, and parks (Nicholson, 1997). They have been observed in the vicinity of ALF. No potential nest sites were observed during field investigations.

Bewick's wrens occur in brushy areas, thickets, and scrub in open areas. The one record for this species from Shelby County is from 1944. The species is most likely extirpated from the county.

Cerulean warblers occur largely in unfragmented, mature deciduous forests along riparian zones and along ridgetops in higher elevations. The young forest and thickets on the project site do not represent habitat for this species.

Interior least terns nest on sandbars in the Mississippi River, and on mainland sandy areas up to 1.6 kilometers from the river. Prime habitat has less than 10 percent vegetation cover, the presence of large amounts of driftwood, and little human disturbance (Nicholson, 1997). Seven least tern-nesting colonies have been recorded on the Mississippi River within Shelby County from 1992 to 2002. Low-quality nesting habitat occurs within Fill Area 1. Terns are not expected to nest in this location due to human disturbances and poor habitat quality.

Lark sparrows occur in early successional habitats, particularly those that are maintained by burning or grazing. Although the study area contains a large amount of early successional habitat, little of this habitat is suitable for lark sparrows.

Mississippi kites have been found nesting in mature bottomland forests but also in urban areas of Memphis. A kite nest is reported to occur in Fill Area 3. However, this nest was not located during field investigations. Another nest occurs 0.4 mile southeast of the east pond. Mississippi kite populations and range have increased in Tennessee (Nicholson, 1997).

Swainson's warblers nest in wooded bottomlands and ravines with a thick, shrub understory. Numerous records of Swainson's warblers occur for Shelby County. Habitat for this species occurs within the vicinity of ALF.

Eastern big-eared bats inhabit the forested regions of the South (Linzey, 1998). They roost in buildings, attics, hollow trees, mines, and caves (Linzey, 1998).

Eastern woodrats can be found in a variety of places including stream or gully banks, wooded bottomlands, swamps, caves, and cliffs (Linzey, 1998). Limited habitat for this species exists on the project site.

Indiana bats roost in caves during the winter and form summer roosts under the bark of living and dead trees. Their summer roosts are found in forests with an open understory, usually near water. Indiana bats forage primarily in forested areas along streams or other corridors. Poor-quality summer habitat exists within the ALF vicinity.

Southeastern shrews are found in a variety of habitats. They prefer moist situations in woods or fields (Linzey, 1998) including disturbed habitat such as abandoned fields with dense ground cover of honeysuckle, grasses, sedges, and herbs (Linzey and Brecht, 2002). The species likely occurs in the project site.

Striped whitelips are known from a population south of the project area. The species typically occurs in mesic forests. Four populations are known in Shelby County.

3.4.4. Threatened and Endangered Species (Plants)

A review of the TVA Natural Heritage database indicated that no federally or state-listed plant species are known from within 5 miles of the project site in Shelby County, Tennessee. In addition, field inspections of the project area reveal that no other rare plant species is present on lands to be affected by the proposed activities. Several weedy plant species uncommon in Tennessee were found on the ALF property, but their occurrence is thought to be adventive and will not persist in the flora of this area. Clasping coneflower and prairie sunflower (new records for Tennessee) were found in Area 4. Other uncommon plants found on the project sight were camphorweed, plains snake cotton, puncture vine, and slender snake cotton.

3.5. Aquatic Ecology

3.5.1. Aquatic Life

The proposed project is on or adjacent to the property of ALF in Shelby County, Tennessee. No field survey of the project was necessary because aerial photographs provided with the environmental review files indicated no streams, wet-weather conveyances, or ponds in the project area that would be disturbed. The proposed work, however, is not far from the Mississippi River and McKellar Lake.

3.5.2. Aquatic Threatened and Endangered Species

A review of the TVA Natural Heritage database indicated that one state-listed fish, blue sucker, is known to occur in the Mississippi River near McKellar Lake. According to Starnes and Etnier, 1980, the blue sucker, state-listed as threatened by Tennessee Wildlife Resources Agency (TWRA) is found in larger rivers of the Mississippi Basin and Gulf Coastal drainages. Blue suckers prefer deep-flowing water with velocities up to 2.6 meters/second (Etnier and Starnes, 1993). While the blue sucker is not likely to move through McKellar Lake, it is likely that a population exists in the Mississippi River.

3.6. Wetlands

A ground survey was conducted in July 2005 of the three areas identified as potential sites for ash placement (Areas 1, 2, and 3). The spoils from Area 4 would be used as cover material for vegetation of disturbed portions of Area 2 or 3. Wetland W1 was identified in Area 1 and meets United States Army Corps of Engineers' (USACE) wetland determination standards. A forested wetland, W1 occupies the center of a peninsula that extends northeast between the Mississippi River and a canal that provides river access to coal unloading facilities at ALF. See Figure 3-1 for the location of W1. The environmental function of this wetland includes flood storage, storm water reduction, erosion control, wildlife habitat, and maintenance of species and landscape diversity. There are no wetlands in Areas 2, 3, or 4.

Wetland W1 is a forested wetland that has formed in a crescent-shaped depression within the interior of a peninsula that extends northeast between the Mississippi River and a canal that provides river access to coal unloading facilities at ALF. The dominant vegetation species in the wetland are eastern cottonwood (*Populus deltoids*), black willow (*Salix nigra*), green ash (*Fraxinus pennsylvanica*), hackberry (*Celtis occidentalis*), silver maple (*Acer saccharinum*), and slippery elm (*Ulmus rubra*). The understory is dominated by numerous vines including Japanese honeysuckle (*Lonicera japonica*) and trumpet creeper (*Campsis radicans*). The soils in and around W1 are sandy materials deposited by frequent inundation of the Mississippi River (which also serves as the primary hydrologic source for the wetland). Runoff from the surrounding slopes would be minimal due to the high infiltration rate of the surrounding soil. Woody debris (deposited frequently by inundation) acts as a mulch and helps store water on the site.

Figure 3-1. Wetland W1, Location in Fill Area 1

3.7. Floodplains

ALF is located on McKellar Lake, opposite the Mississippi River at about Mississippi River Mile (MRM) 725.6 in Shelby County, Tennessee. The potential area impacted by the ash management strategy would extend from about MRM 724.0 to MRM 726.6. The 100-year flood elevation at MRM 724.0 is 224.0, and at MRM 726.6, the 100-year flood elevation is 225.5. "The 500-year flood frequency flood discharges and corresponding flood elevation on the Mississippi River within the study area were not determined, because of the difficulty in analyzing a specified flood frequency of this magnitude in such a large and unique drainage basin." (Federal Energy Management Agency, 1994). One of the potential disposal areas, Fill Area 2, is located behind the Ensley Levee at the north end of the Pidgeon Industrial Park. The USACE determined the 100-year flood level within the levee to be at elevation 204.0, with a coincidence high flood stage on the river. The 500-year flood level within the levee has not been determined (Fisher-Phillips-Arnold, Inc., 1992).

3.8. Solid Waste

3.8.1. Estimated Ash Production/Ash Utilization

ALF consists of three 330-megawatt cyclone furnaces that burn about 1.8 million tons of coal per year. A small amount of tire-derived fuel is also burned at the plant (less than 5 percent of the total fuel). The five-year average annual ash production from 2000-2005 is estimated to be ~153,500 tons [dry basis]. Ash produced consists of fly ash and boiler slag. For ash management planning purposes, TVA generally uses 100 percent of total ash production for a 15- to 20-year period and does not reduce this volume for anticipated ash marketing or utilization. Total ash production for 15-20 years at ALF would therefore range from 2.3-3.1 million tons.

Fly ash and boiler slag are made up of the noncombustible particles contained in the coal plus a small amount of carbon, which remains from incomplete combustion. These materials are generally gray to black in color and consist of fine silt-sized particles up to sand or fine gravel-sized particles. The U.S. Environmental Protection Agency (USEPA) has determined that these materials are nonhazardous and encourages their use as a substitute for other natural materials such as sand, gravel, and cement, which may be mined or manufactured (USEPA, 2000).

Although ALF did market small amounts of fly ash a number of years ago, the system for collection and sale of dry fly ash was abandoned. Fly ash is now sluiced to the east ash pond. ALF has had a long-term relationship with Reed Minerals, a company that reclaims, processes, and markets the boiler slag from the plant. Boiler slag is also sluiced to the east ash pond, but Reed Minerals intercepts the slag in a small surge pond before it can enter the main pond. The material is processed in an on-site facility that washes and sizes the slag into several size fractions, which are marketed for various uses, primarily as industrial abrasives and granules for asphalt roofing shingles. Historically, 50,000-100,000 tons of slag per year have been reclaimed and marketed at ALF. Slag quality is affected by coal supply, burning of tire-derived fuel, and other operational factors. Fines from the slag recovery and processing operation flow into the main ash pond. Although TVA expects to continue marketing significant quantities of slag, for the purposes of planning ash disposal capacity, these numbers will not be taken into consideration.

3.8.2. Existing Ash Disposal Areas

The west ash pond is a currently inactive ash disposal area. In 1991-1992, ~300,000 tons of ash was removed from this pond for use in the Ensley Levee structural fill project (TVA, 1991a). Sluice lines from the east ash pond were then rerouted to the west pond so that the east pond (active ash pond) could be dewatered. An additional 400,000 tons of ash was removed from the east ash pond (a total of about 700,000 tons of ash was used in the project). The west pond was sluiced to almost full again before the sluice lines were returned to the east pond.

The east ash pond is an ash easement area currently used to receive sluiced boiler slag and fly ash. Currently, Reed Minerals reclaims most of the boiler slag and processes it for use in industrial abrasives. Therefore, most of the ash deposited in the east pond is either fly ash or slag fines not reclaimed by Reed Minerals. This pond is required to maintain 158,400 yd^3 of FWV in order to comply with its NPDES permit conditions. To maintain this volume, it has been necessary to construct a dredge cell within this pond to receive ash dredged from the rest of the pond. Dredged ash is being reclaimed from the dredge cell for other small structural fill projects in the vicinity of the plant. It is anticipated that TVA would continue to pursue such small structural fill projects regardless of the long term ash management strategy selected.

3.9. Cultural Resouces

The West Tennessee Uplands have been an area of human occupation for the last 12,000 years. In this area, prehistoric chronology is generally broken into five broad time periods: Paleo-Indian, Archaic, Gulf Formational, Woodland, and Mississippian. Prehistoric land use and settlement patterns vary during each period, but short- and long-term habitation sites are generally located on floodplains and alluvial terraces along rivers and tributaries. Specialized campsites tend to be located on older alluvial terraces and in the uplands. Shelby County was established on November 24, 1819, and due to its location, was a heavily used travel and trade center. Trails made by the Chickasaws were later used as railroad routes leading from what is now Memphis to northwest Alabama and northeast Mississippi. The City of Memphis was incorporated as a town in 1826, and the arrival of railroads made it, along with the rest of Shelby County, the economic center of the region.

The archaeological Area of Potential Effect (APE) for this project was determined to be the entire area of the four tracts, totaling 255 acres. No architectural/historical investigation was carried out, due to the absence of aboveground construction associated with the project, the lack of residential or older commercial development in the vicinity, and the presence of recent industrial development already within the project viewshed. Prior to the survey, a records search was conducted to identify previously recorded historic properties that may be located within the APE. One previously recorded archaeological site was identified (40SY566).

Site 40SY566, is the former location of the Ensley Plantation. The work found little in the way of deposits relating to the primary 19th century occupation of the site, and the site is recommended as ineligible for listing on the National Register of Historic Places (NRHP). During the survey in 2004, scatters and clustered artifacts were identified to the north and south of Site 40SY566, which are interpreted as remnants of domestic structures. These deposits are recommended as ineligible for listing on the NRHP.

A Phase I archaeological survey was conducted in 2005 of the four project-area tracts. No archaeological materials were identified in Fill Areas 1, 2, and 3. Fill Area 4 contained the

only remnant of original soil left within the four surveyed tracts. A scatter of surface artifacts associated with site 40SY566 was identified near a cotton field. No intact archaeological artifacts were identified. The portion of Site 40SY566 within Fill Area 4 is recommended as ineligible for listing on the NRHP due to the low density of artifacts and the lack of intact deposits.

3.10. Prime Farmland

Prime farmland has the best combination of soil with physical and chemical characteristics for producing food, fiber, forage, oilseed, and other agricultural crops with minimum inputs of fertilizer, pesticides, and labor, and without intolerable soil erosion. This land can be cropland, pastureland, rangeland, forestland, or other land not urban or water. The conversion of farmland to industrial and other nonagricultural uses essentially precludes farming the land in the foreseeable future. The 1981 Farmland Protection Policy Act set guidelines that require all federal agencies to evaluate impacts to farmland prior to permanently converting to land use incompatible with agriculture. In assessing farmland impacts, Form AD 1006, “Farmland Conversion Impact Rating” is completed by federal agencies with assistance from the Natural Resources Conservation Service before an action is taken. TVA determines impacts before implementing any action that includes soil-disturbing activities on 10 or more acres of land.

Potential ash disposal sites are Fill Areas 1, 2, and 3. Fill Area 4 has been used by the Port Commission for disposal of dredged spoil material. It has been proposed that spoil from this site be used as cover material for vegetation of disturbed areas.

Soils with prime farmland properties that occur on the potential disposal sites are Robinsonville and Commerce silt loam soils (Table 3-3). Fill Area 3 has 29.6 acres of Robinsonville soil, which covers 31 percent of the site. This acreage is mostly forest and occupies the western portion of the area. Fill Area 2 contains 13.3 acres of Commerce and 1.4 acres of Robinsonville soil. This acreage lies in a narrow strip along the eastern side of the area. Soils on the peninsula of Fill Area 1 have not been surveyed. All of Fill Area 4 was classified as prime farmland prior to being used for a disposal site.

All of the acreage proposed for the Action Alternatives is zoned for industrial land use. Because of the urban zoning, the land is not subject to protection under the Farmland Protection Policy Act, and completion of the farmland rating is not required.

Table 3-3. Soil Descriptions

FILL AREA	SOIL MAPPING UNIT	DESCRIPTION	PRIME FARMLAND	ACRES
1	SNS	SOILS NOT SURVEYED	Not	45.9
	W	WATER	Not	23.8
2	Cu	CREVASSE FINE SAND	Not	0.8
	Lb	LEVEES AND BORROW PITS(UDORTHENTS, SILTY)	Not	54.7
	Cr	COMMERCE SILT LOAM	All	13.3
	Rn	ROBINSONVILLE SILT LOAM	All	1.4
3	Cu	CREVASSE FINE SAND	Not	27.3
	Lb	LEVEES AND BORROW PITS(UDORTHENTS, SILTY)	Not	32.8
	Rn	ROBINSONVILLE SILT LOAM	All	29.6
	W	WATER	Not	6.1
4	Cr	COMMERCE SILT LOAM	All	1.0
	Rn	ROBINSONVILLE SILT LOAM	All	19.0

Source: U.S. Department of Agriculture (2004)

3.11. Natural Areas

A review of the TVA Natural Heritage Database indicated that the proposed ash management plan for ALF is within 3 miles of four managed areas and/or ecologically significant sites and no Nationwide Rivers Inventory Stream or Wild and Scenic River.

T.O. Fuller State Park is located in southwest Tennessee in Shelby County within the limits of the City of Memphis. It is situated south of the confluence of Nonconnah Creek and McKellar Lake, a partially isolated extension of the Mississippi River, and is ~0.1 mile from the proposed activity. This 1,138-acre forested area includes within its boundaries the historic Chucalissa Indian Village. This park has an abundance of beech and hickory trees and features loessel bluffs reaching up to 100 feet that are composed of wind-blown silt that was carried by melted water of the ancient glaciers thousands of years ago. This park is also a popular camping destination.

Chucalissa Village State Archaeological Park is located within the boundaries of T.O. Fuller State Park and contains native houses of the Chickasaw Indians, a historic Indian temple, covered archaeological excavation, and a museum. This 15th century Indian village is located ~0.1 mile from the proposed activity.

President's Island Wildlife Management Area is located in southwest Tennessee. This 6,300-acre area in Shelby County is ~0.9 mile from the proposed activity. This area is managed by TWRA, and hunting is allowed.

Riverside (M. L. King) City Park is located in southwest Tennessee in Shelby County and managed by the City of Memphis. This park is ~2.9 miles from the proposed activity.

3.12. Visual

Visual resources are evaluated based on existing landscape character, distances of available views, sensitivity of viewing points, human perceptions of landscape beauty/sense

of place (scenic attractiveness), and the degree of visual unity and wholeness of the natural landscape in the course of human alteration (scenic integrity).

The proposed project area is located just southwest of the urban center of Memphis, Tennessee, on McKellar Lake, which is a narrow and gently winding embayment of the Mississippi River. Existing views are predominated by agricultural and heavy industrial operations in the foreground (within 0.5 mile from the observer) and middleground (0.5 mile to 4 miles from the observer) viewing distances. Floodplains expand to the south and the west following the river, and the topography remains uniform throughout the view, the only exceptions occurring where earthen levees have been constructed to withhold floodwaters from the landward cropland. Vegetation is sparse beyond the levees, where cropland is protected, but densely lines the southern shores of Lake McKellar approaching the project site.

The scenic attractiveness of the proposed project area is minimal to common, and the scenic integrity is very low to low.

3.13. Seismology

3.13.1. Earthquake Hazards

ALF is located in the Gulf Coastal Plain Physiographic Province and lies within the Mississippi Embayment. The surface geologic formation is quaternary alluvial deposits composed of gravels, sand, silt, and clay (Hart, 1979). The primary source of earthquake hazard to the ALF site is the New Madrid Seismic Zone. The New Madrid Seismic Zone is located in the central Mississippi Valley and extends from northeastern Arkansas to northwestern Tennessee and southeastern Missouri. The New Madrid Seismic Zone has produced several damaging earthquakes highlighted by the sequence of very large earthquakes and aftershocks that occurred during 1811-1812.

The strength and thickness of soils strongly influence the amount and type of shaking a structure is subjected to during earthquakes. Generally, sites founded on soft rocks and soils experience much stronger shaking than sites founded on competent, hard rock. On the NEHRP (National Earthquake Hazard Reduction Program) scale, the hardest rock conditions are Category A and the softest soils fall in Category F. Geotechnical investigations reveal that the soils at ALF generally correspond to rock/soil Category D (LAWGIBB, 1999), but the actual seismic foundation classification would need to be determined by borings in the subsurface at the chosen ash disposal location. The geologic deposits in this area have some potential for earthquake-induced liquefaction, but the actual determination of liquefaction potential would be determined by collection and analysis of geotechnical data at the selected site.

The earthquake hazard at a site can be modeled probabilistically by considering all seismic source zones around a site and the probability that these source zones will produce earthquakes of various sizes. The U.S. Geological Survey (USGS) performed probabilistic seismic hazard analyses throughout the United States to prepare the 2002 national seismic hazard maps (USGS, 2002). The USGS's analysis assumes that the foundation corresponds to NEHRP B-C (intermediate between Categories B and C) site conditions. The B-C foundation conditions are assumed to correspond to the definition of "lithified earth material" as described in Tennessee Solid Waste Regulation 1200-1-7.

Table 3-4 presents the USGS's seismic hazard values for a point (35.10 degrees north, 90.10 degrees west) that is very near the ALF (35.07 degrees north, 90.14 degrees west) location. The USGS computes ground shaking at three different frequencies of motion: peak ground acceleration, 5.0, and 1.0 Hertz. The USGS expresses seismic hazard as the minimum horizontal ground motion that would be expected to occur during a specified time span. In the same way that the "100-year flood" means the level of flooding expected to occur at least once during 100 years, ground-shaking return periods refer to the minimum level of ground shaking expected during the specified time. Tennessee Solid Waste Regulation 1200-1-7 requires that Class I or II ash disposal facilities' purposes be designed for earthquake shaking with a 10 percent chance of exceedance in 250 years, which corresponds to a 2,375-year return period. Since the computed maximum horizontal acceleration at ALF is greater than 0.1g (acceleration due to gravity) (actual value is 0.71g), Tennessee Solid Waste Regulation 1200-1-7 classifies this site as being within a seismic impact zone.

Table 3-4. United States Geological Survey (2002) Probabilistic Ground Motion Values at Allen Fossil Plant

	Ground Accelerations in Percent (%) g
Ground Motion Frequency	10% Probability of Exceedance in 250 years (2,375-year return period)
Peak Ground Acceleration (also referred to as maximum horizontal acceleration)	70.92% g
5.0 Hertz	134.14% g
1.0 Hertz	36.76% g

% = percent
g = acceleration due to gravity

3.13.2. Surface Faulting Potential

The 1811-1812 sequence of earthquakes in the New Madrid Seismic Zone formed a fault scarp immediately west of Reelfoot Lake in extreme northwestern Tennessee. The Reelfoot fault scarp and the relative motion of blocks on either side of the fault during the 1811-1812 sequence of earthquakes resulted in the formation of Reelfoot Lake. Earthquake faulting associated with the 1811-1812 earthquakes was clearly expressed at the surface although actual ground rupture may not have occurred. Surface faulting may have occurred in conjunction with the 1811-1812 New Madrid earthquakes well to the north of ALF, but Hart (1979) did not map or describe any faulting at or near the plant.

3.14. Socioeconomics and Environmental Justice

ALF is located in the southwestern portion of Shelby County. The county is predominantly urbanized with 87 percent of its population in the cities of Memphis, Germantown, Bartlett, Millington, Collierville, Arlington, and Lakeland. The distribution of employment in the county shows less dependence on manufacturing than the state as a whole, with 7 percent of Shelby County employment, compared to 12.2 percent statewide. The employment share in farming is also less than the state. Conversely, Shelby County has a larger share

of employees in the wholesale and retail trade; transportation and warehousing; finance, insurance, and real estate; and services and government sectors. Total employment in Shelby County in 2003 was 615,757, including both full-time and part-time jobs. The labor market area is defined to include seven adjacent counties--Crittenden County, Arkansas; Desoto, Marshall, Tate, and Tunica Counties, Mississippi; and Fayette and Tipton Counties, Tennessee.

Compared to its labor market area and the state, Shelby County has a larger share of its workers employed in management and professional occupations and in sales and office occupations. The share of total employment in service occupations in Shelby County, the labor market area, and the state is similar. The county has a lower share in the other occupational categories. The labor market area also has a larger share of its workers in management and professional, sales, and office jobs than does the state as a whole.

3.14.1. Population

According to the 2000 U.S. Census, Shelby County had a population of 897,472, an increase of 8.6 percent since the 1990 Census of Population count of 826,330. The labor market area had a 2000 population of 1,205,204, an increase of 12.9 percent from the 1990 total of 1,067,263.

The population of Shelby County is 47.3 percent white according to the 2000 U.S. Census. The remaining population is largely black, 48.6 percent of the total. The Hispanic population in 2000 was 2.6 percent of the total. The labor market area population is 52.9 percent white and 43.5 percent black. The state percentage of white population is much higher; 80.2 percent white and 16.4 percent black. Among the labor market counties, the percentage of black population ranges from a low of 11.4 percent in Desoto County, Mississippi, to a high of 70.2 percent in neighboring Tunica County, Mississippi.

3.14.2. Income and Employment

Per capita personal income in Shelby County in 2003 was $34,087 or 19 percent higher than the state average of $28,641, and 8.3 percent higher than the national average of $31,472. The level was somewhat lower in the labor market area as a whole, $31,677 or 10.6 percent higher than the state, and 0.6 percent higher than the nation. There was considerable variability, however, among the counties in the labor market area, ranging from $19,224 in Marshall County, Mississippi, to $34,087 in Shelby County.

Nearly 13 percent of all families in Shelby County were below poverty level in 1999 according to the U.S. Census. This compares with the 12.6 percent for the labor market area and 10.3 percent for the State of Tennessee. The family poverty level among all eight labor market counties varied greatly ranging from a low of 5.6 percent in Desoto County, Mississippi, to a high of 28.1 percent in Tunica County, Mississippi, in 1999.

Service sector employment was the largest source of earnings in Shelby County, contributing 31.8 percent of total earnings. Employment in wholesale and retail sales accounted for 15 percent of earnings, and government contributed 14 percent. Finance/insurance and real estate/rental /leasing together, as well as manufacturing, totaled 10 percent each, and transportation/warehousing contributed 12 percent.

The distribution of jobs by industry in Shelby County is similar to that of earnings, but differences in wages and in use of part-time employees among industries yield some variation in the above percentages. As a percent of county totals, employment in

manufacturing is 7 percent (versus 10 for earnings), transportation is 10 percent (versus 12 for earnings), Finance/Insurance and Real Estate/Rental/Leasing is 8 percent (versus 10 percent for earnings), and Government is 13 percent employment (versus 14 percent earnings), reflecting higher than county average wages in those industries. Just the reverse is true in the case of wholesale and retail trade (17 percent of employment versus 15 percent of earnings) and services (39 percent of employment versus 32 percent of earnings).

With a civilian labor force of 434,530 in 2004, Shelby County has an unemployment rate of 6.2 percent. The labor market area unemployment rate was also 6 percent. This rate is below the state (5.4) and the national (5.5) unemployment rates.

3.15. Transportation

Highway, rail, and barge modes of transportation serve ALF. Portions of the existing transportation network near the plant are shown in Figure 3-2. The plant is located in Memphis, Tennessee, in Shelby County. The nearest interstate highways are Interstate (I) 40, which runs between Nashville and Memphis, Tennessee, and I-55, which runs between Memphis and Jackson, Mississippi. Access to ALF is via Riverport Road, which is a high-quality road that also provides for adequate industrial access for heavy trucks and equipment to the industrial park located west of ALF. The delivery route from ALF for ash disposal at the Waste Management Tunica, Mississippi, Landfill would be Plant Road, Riverport Road, I-55, U.S. Highway (US) 61, Mississippi State Route (SR) 3, and Bowdre Road. I-55, Riverport Road, and US 61 are all multilane roadways. Some portions of Riverport Road and US 61 have a center turning lane, the remaining portions are divided with a median, and both have adequate lane widths. Mississippi SR 3 and Bowdre Road are both rural, low-volume roads. Table 3-5 shows the Average Annual Daily Traffic (AADT) counts for the affected routes.

Table 3-5. Average Annual Daily Traffic Counts for Affected Routes

Route	AADT (vehicles/day)
I-55	61,590
US 61	Ranges from 22,980 - 48,990
Riverport Road	4,432
Plant Road	Data not available
SR 3	1,300
Bowdre Road	80

Sources: Tennessee Department of Transportation, 2004; Mississippi Department of Transportation, 2004; City of Memphis Traffic Engineering Department, 2001; Tunica County Engineering Department, 2005

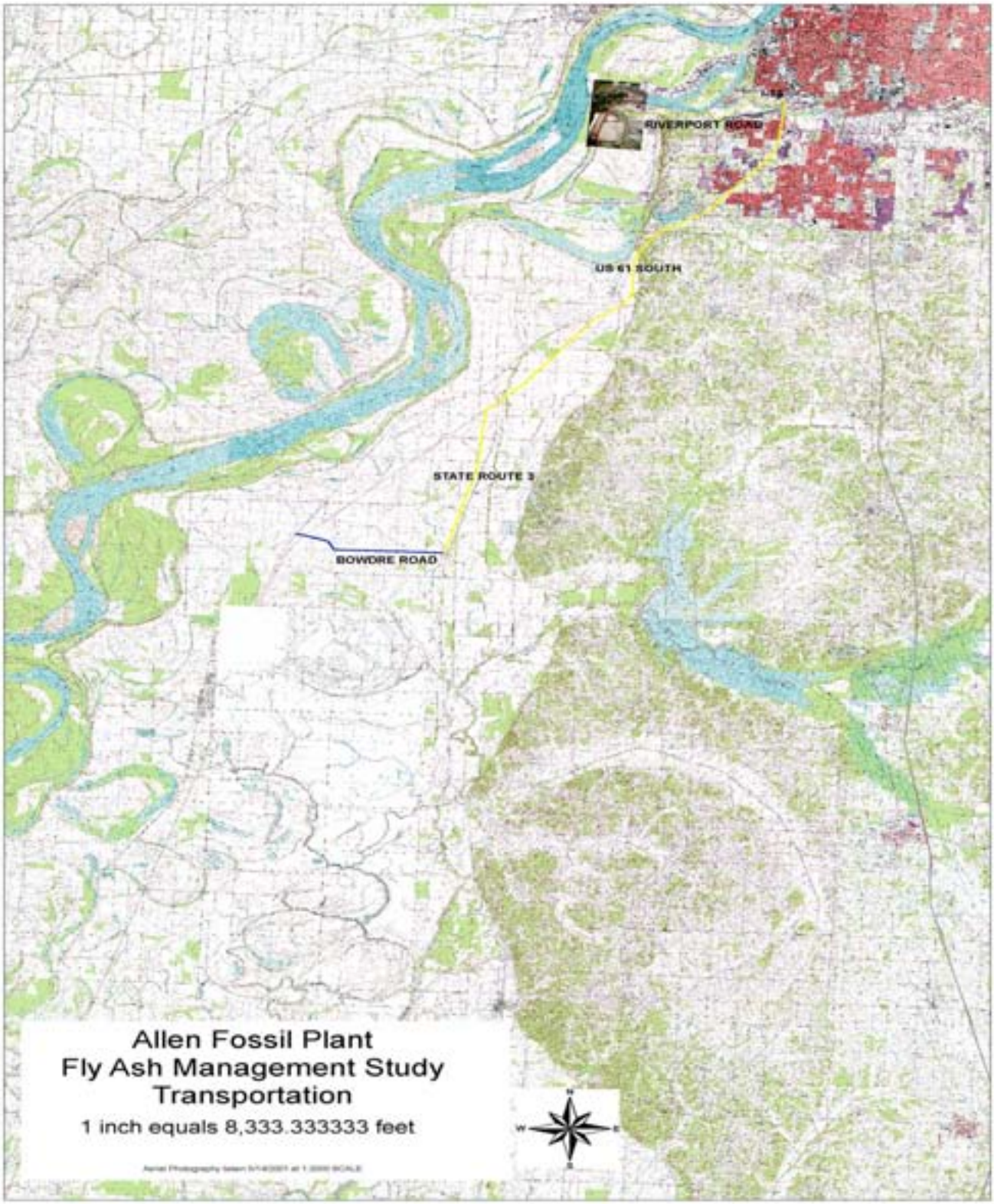

Figure 3-2. Transportation Map

CHAPTER 4

4. ENVIRONMENTAL CONSEQUENCES

This section discusses the environmental consequences of each resource and the effects of these consequences for the following alternatives:

- Alternative A - The No Action Alternative
- Alternative B - Develop Fill Area 1 as a New Ash Pond or Dredge Cell and Sluice Fly Ash as Produced or Dredge Fly Ash From the East Ash Pond
- Alternative C - Develop Fill Area 2 as a Structural Fill to Support Intermodal Transfer in the Pidgeon Industrial Park
- Alternative D - Develop Fill Area 3 as a Structural Fill to Support Development Associated With the Pidgeon Harbor Installation
- Alternative E - Dredge the East Ash Pond and Haul the Ash to a Commercial Municipal Solid Waste Landfill
- Alternative F - A Combination of Two or More of Action Alternatives B Through E

4.1. Air

4.1.1. Alternative A

Under the No Action Alternative, current air quality in the vicinity of ALF is expected to continue consistent with the approved Tennessee Air Pollution State Implementation Plan.

4.1.2. Alternatives B Through E

4.1.2.1. Construction Impacts

Under Action Alternatives B and D, transient air pollutant emissions would occur during the construction of the clay dikes for Fill Areas 1 and 3. Construction-related air quality impacts are primarily related to land clearing, site preparation, and the operation of internal combustion engines. For Alternative E the only air quality impacts would be those of normal permitted activities at an existing landfill.

4.1.2.2. Vehicle Emissions and Excavation Dust

Land clearing, site preparation, and vehicular traffic over unpaved roads and construction sites result in the emission of fugitive dust particulate matter (PM) during site preparation and active construction periods. The largest-size fraction (greater than 95 percent by weight) of fugitive dust emissions would be deposited within the construction site boundaries. The remaining fraction of PM would be subject to longer-range transport. Wet suppression would be used on open-construction areas and unpaved roads to reduce fugitive dust, if necessary.

Combustion of gasoline and diesel fuel by internal combustion engines (vehicles, generators, construction equipment, etc.) would generate local emissions of PM, nitrogen oxides (NOx), carbon monoxide, volatile organic compounds (VOCs), and sulfur dioxide throughout the site preparation and construction period. The total amount of these emissions would be small and would result in minimal off-site impacts.

Air quality impacts from construction activities would be temporary and would be dependent upon both man-made factors (e.g., intensity of activity, control measures, etc.), and natural factors (e.g., wind speed, wind direction, soil moisture, etc.). However, even under unusually adverse conditions, these emissions would have, at most, a minor, transient impact on off-site air quality that would not exceed or violate any applicable ambient air quality standard. Overall, the air quality impact of construction-related activities for the project would not be significant.

4.1.2.3. Operational Impacts

Operation of the Action Alternatives under consideration would not adversely impact local air quality. For Action Alternatives B and D, fly ash would either be sluiced or hydraulically dredged and would not result in air emissions. For Alternatives C and E, emissions of fugitive dust PM would result from excavation of the fly ash, open storage piles, loading, unloading, and vehicular traffic over paved and unpaved haul roads. Also for Alternative C, emissions would occur from the hauling and placement of cover material to cover Fill Area 2 totally.

Emissions from excavating and hauling the ash would be minimized by using wet suppression as needed. The use of these control measures would keep emissions from this project from having an adverse impact on air quality.

4.1.3. Alternative F

Alternative F would be a combination of two or more of the above Alternatives B through E. With controls in place to minimize air emissions, this alternative should not individually or cumulatively have an impact on the air quality in the region.

4.2. Surface Water

4.2.1. Alternative A, No Action Alternative

If no action were taken, ALF would eventually cease to be in compliance with the FWV requirements specified for the east ash pond in the current NPDES permit. Not meeting the FWV requirements would increase the risk of discharging waters of degraded quality from the east ash pond outfall, and TDEC could impose restrictions on ALF. Being in a noncompliance status would negatively impact the facility and the surface waters.

4.2.2. Action Alternatives B Through F

4.2.2.1.Construction impacts

Construction activities at each of the four fill areas would disturb more than 1 acre; consequently, a construction general permit would need to be obtained prior to commencement of construction at any of these locations. In addition, if the west ash pond

were reactivated (Alternatives C and D); a new discharge line of ~1,750 linear feet would need to be installed. If the width of the disturbance were ~25 feet or more, the total disturbed area would be at least 1 acre. Therefore, this work alone or in conjunction with the other construction activities would also require a construction general permit. A storm water pollution prevention plan would be developed (or augmented), which would include appropriate best management practices (BMPs) to minimize or eliminate sediment loading in runoff from the construction area(s), including any borrow areas. Storm water runoff from the site would be controlled in sedimentation basins if the total disturbed area at any given time is greater than or equal to 10 acres; otherwise a sediment trap or equivalent control measures would be used. All erosion prevention and sediment controls would be in place and functional before start of construction and would be properly maintained.

In accordance with 40 Code of Federal Regulations (CFR) 112, drums/tanks 55-gallons or larger containing a petroleum product (e.g., oil, gas, or diesel) would have secondary containment. This requirement applies to fuel tanks on heavy equipment while the equipment is not in operation. Secondary containment options such as dikes, berms, catch basins, and/or portable containment structures would be used.

Portable toilets or existing facilities would be made available to the construction workforce. If portable toilets were used, they would be pumped out regularly and the sanitary waste would be transported by a tanker truck to a publicly owned treatment works.

Implementation of the measures stipulated for the construction activities would ensure insignificant impacts on surface waters.

4.2.2.2. Operational Impacts

4.2.2.2.1.Alternative B

Under Alternative B, the fly ash would either be wet sluiced or hydraulically dredged from the east ash pond to Fill Area 1. The discharge from the Fill Area 1 ash pond, or the dredge sluice water from Fill Area 1 would either be returned to the current NPDES-permitted east ash pond for discharge, or be discharged through a new NPDES-permitted discharge to McKellar Lake. In either case, the effluent would have to meet the applicable NPDES permit conditions/requirements. Implementation of these measures would ensure insignificant operational impacts on surface waters.

4.2.2.2.2.Alternative C

Under Alternative C, fly ash would be removed from both the east ash pond, including the temporary dredge cell, and from the currently inactive west ash pond and hauled to Fill Area 2. Initial excavation of the west ash pond would be done under “zero flow” conditions, reducing the risk of impacting surface waters. Potentially, the west ash pond would be reactivated requiring notification to TDEC. If the west ash pond were reactivated, the FWV, water quality monitoring, and effluent limit requirements specified in the NPDES permit would be met.

The west ash pond is smaller than the east ash pond. However, potential ammonia-laden waters entering the west ash pond from the selective catalytic reduction (SCR) operations should not have a significant impact on the discharge-receiving stream (Mississippi River).

During the planning stages for the installation/operation of the SCRs, conservative estimates were made to determine the ammonia concentrations in the east and west ash pond discharges due to SCR operations (TVA, 2001). These calculations did not consider any ammonia loss in the ash ponds (e.g., volatilization, biological uptake, or degradation); regardless, no significant impacts were identified for either of the ash pond discharges.

The fly ash would be reclaimed from the east ash pond and west ash pond areas, dewatered as needed, loaded onto trucks, and hauled to Fill Area 2 for placement and compaction. The fly ash would be dewatered such that the ash moisture content would be reduced to ~18-25 percent and there would be minimal free water (C. Miller, TVA, personal communication, July 12, 2005). All trucks would be tarped and have sealed tailgates to prevent ash/soil spillage. Wheel washes and rock runouts to clean tires prior to trucks leaving the ash loading area and water trucks and sweeper trucks to prevent tracking and airborne particulates would be utilized individually or in combination as needed. During reclamation of ash from an active ash pond, visual inspections of the outfall for turbidity, color, or other objectionable matter would be conducted, and all NPDES permit conditions/requirements would be met.

The ground cover material on Fill Area 2 may be stripped and stockpiled prior to placement of ash in that area. While the ground cover material is stockpiled, it would be temporarily stabilized with vegetative cover, mulch, and/or other suitable BMPs. The cover material would be replaced after the fill was completed. During the placement and compaction of the ash, the activity would be sequenced to minimize the exposure time of graded or denuded areas. Areas of the completed phase would be managed in accordance with project SWPP. Permanent stabilization of the fill area would be done with a permanently stable, noneroding surface in accordance with the construction general permit requirements.

Implementation of these measures would ensure insignificant operational impacts on surface waters.

4.2.2.2.3.Alternative D

Under Alternative D, fly ash would be either wet sluiced or hydraulically dredged from the east ash pond, including the temporary dredge cell, and/or from the currently inactive west ash pond to Fill Area 3. Initial excavation of the west ash pond would be done under “zero flow” conditions reducing the risk of impacting surface waters. Trucks would haul the excavated fly ash material to Fill Area 3 for disposal. All trucks would be tarped and have sealed tailgates to prevent ash spillage. Wheel washes and rock runouts to clean tires prior to trucks leaving the ash loading area and water trucks and sweeper trucks to prevent tracking and airborne particulates would be utilized individually or in combination as needed.

Potentially, the west ash pond would be reactivated requiring notification to TDEC. If the west ash pond were reactivated, the FWV, water quality monitoring, and effluent limit requirements specified in the NPDES permit would be met.

As previously stated, the west ash pond is smaller than the east ash pond. However, potential ammonia-laden waters entering the west ash pond from the SCR operations should not have a significant impact on the discharge-receiving stream (Mississippi River). During the planning stages for the installation/operation of the SCRs, conservative

estimates were made to determine the ammonia concentrations in the east and west ash pond discharges due to SCR operations (TVA, 2001). These calculations did not consider any ammonia loss in the ash ponds (e.g., volatilization, biological uptake, or degradation); regardless, no significant impacts were identified for either of the ash pond discharges.

The discharge from the Fill Area 3 ash pond, or the dredge sluice water from Fill Area 3 would either be returned to the east ash pond or the west ash pond (if the west ash pond is reactivated); or would be discharged through a new, temporary NPDES-permitted discharge to the Mississippi River for the duration of the sluicing/dredging. Wherever the Fill Area 3 effluent would be sent, the NPDES permit conditions/requirements for that outfall would be met.

Implementation of these measures would ensure insignificant operational impacts on surface waters.

4.2.2.2.4.Alternative E

Under Alternative E, fly ash would be hydraulically dredged into the existing temporary dredge cell within the east ash pond, dewatered, excavated, dried, and then hauled off site to a commercial municipal solid waste landfill for disposal. All trucks would be tarped and have sealed tailgates to prevent ash spillage. Wheel washes and rock runouts to clean tires prior to trucks leaving the ash loading area and water trucks and sweeper trucks to prevent tracking and airborne particulates would be utilized individually or in combination as needed. Removal of ash from the dredge cell/ash pond would occur in a manner to ensure ALF remains in compliance with the FWV requirements of the NPDES permit. During removal of ash from the ash pond, visual inspections of the outfall for turbidity, color, or other objectionable matter would be conducted, and all NPDES permit conditions/requirements would be met. Implementation of these measures would ensure insignificant operational impacts on surface waters.

4.2.2.2.5.Alternative F

Alternative F, a combination of two or more of Alternatives B through E, would have an insignificant impact, as each of the individual alternatives would have no significant impact individually or cumulatively.

4.3. Groundwater

4.3.1. Alternative A

There would be no additional groundwater resource impacts associated with this alternative.

4.3.2. Alternative B

Groundwater impacts associated with shallow excavation and grading required for construction of new disposal areas would be insignificant.

Disposal of ammoniated ash and air preheater wash water in Fill Area 1 would result in circulation of ammonia-laden sluice water through the pond. The majority of sluice water (~10.32 million gallons per day on average) would discharge to McKellar Lake either at the

existing NPDES-permitted outfall or at a new permitted outfall. A small portion of the sluice water may infiltrate into the underlying alluvium beneath the pond. Since Fill Area 1 is situated on a peninsula, any seepage entering the underlying groundwater system would ultimately discharge into McKellar Lake. No off-site groundwater transport of ammoniated leachate from the ash pond to adjacent property would occur. Consequently, there would be no impacts to existing or future groundwater users in the site vicinity.

Effects of ammoniated leachate seepage on river water quality and aquatic life are expected to be negligible. The rate of leachate seepage from the ash pond is conservatively estimated to be less than 1 percent of the average effluent discharge from pond outfall. This estimate is based on a detailed ash pond seepage analysis performed by Betson et al. (1986) for similar hydrogeologic conditions. The ammonia nitrogen (NH_3-N) concentration in the ash pond under routine sluicing operations is conservatively estimated to be ~0.10 milligrams per liter (mg/L) (J.R. Quinn, TVA, personal communication, 2005). Since the average NH_3-N concentration of pond seepage would be about 0.10 mg/L and the overall seepage rate less than 1 percent of average pond discharge, the overall effect of pond seepage on lake water quality and aquatic life would be negligible compared with permitted discharges. Likewise, effects of other characteristic ash leachate contaminants (e.g, trace metals, sulfate, total dissolved solids) on lake water quality would also be negligible compared with permitted discharges. The discharge of leachate into surface waters would be addressed in the NPDES permit.

4.3.3. Alternative C

Groundwater impacts associated with shallow excavation and grading required for construction of new disposal areas would be insignificant.

Fill Area 2 would occupy a portion of a previously permitted (TDEC, Division of Solid Waste Management Class II Landfill, Permit No. IDL 79-106-0077) levee, which received ~700,000 tons of ash. Under Alternative C the area would receive additional excavated and dewatered ash from the east and west ponds after removal of the existing soil cover. The primary difference between the composition of the existing and future ash would be the presence of low concentrations of ammonia in the residual moisture of the future ash. Gravimetric moisture content of the excavated/dewatered ash is expected to range from 18 to 20 percent and the NH_3-N concentration of ash pore water would be ~0.10 mg/L. Thus, the overall NH_3-N content of the ash would be ~0.02 milligrams per kilogram. Ammonia present in the ash would be mobilized by infiltrating precipitation and transported by westward-flowing groundwater to the Mississippi River. No impacts to existing or future groundwater users in the site vicinity would be expected because (1) there are no existing groundwater users downgradient of the proposed facility, and (2) NH_3-N (as well as potential transformation products, e.g., nitrate and nitrite) concentrations would be below water quality criteria. Furthermore, water quality and aquatic toxicity impacts of ammoniated leachate seepage on the Mississippi River would be negligible due to the low ammonia concentration of groundwater entering the river and the high dilution capacity of the river.

4.3.4. Alternative D

Groundwater impacts associated with shallow excavation and grading required for construction of new disposal areas would be insignificant.

The operational impacts of this alternative are expected to be similar to those of Alternative C.

4.3.5. Alternative E

Fly ash would be excavated, dewatered, and transported by truck to a commercial landfill. Assuming the landfill were properly operated, impacts to groundwater resources and users would be insignificant.

4.3.6. Alternative F

The operational impacts of combinations of Alternatives B through E would be insignificant, since the individual effect of each of these alternative has been determined to be insignificant.

4.4. Terrestrial Ecology

4.4.1. Wildlife

Most species of wildlife observed on the project area are considered common both locally and regionally, and the proposed project is not expected to result in significant adverse direct, indirect, or cumulative impacts. However, painted buntings are known to nest in the area. Although more common in the western U.S., these small birds are currently known to nest only in Tennessee in habitats adjacent to ALF (see Alternative D for further discussion).

The review of the Tennessee and TVA Natural Heritage databases indicated that a heron colony exists in Shelby County. This colony is at an adequate distance from the proposed project sites; therefore, no impacts are expected to this resource. No caves occur within the proposed project area. None of the proposed alternatives would contribute to the spread of exotic or invasive terrestrial animal species.

4.4.1.1. Alternative A

Under the No Action Alternative, the ash management project would not take place and TVA would continue to deposit ash in the east pond. Fill Areas 1, 2, 3, and 4 would not be altered and, therefore, succession of plant communities and wildlife habitats would continue at current rates. The second-growth bottomland forests would continue to grow into mature forests.

4.4.1.2. Alternative B

If TVA selects Alternative B, Fill Area 1 would be utilized. The site currently is not suitable for ash disposal and TVA would be required to construct a dike around the site to prevent flooding of the storage area.

Currently, the site offers minimal habitat for wildlife. The forested interior of Fill Area 1 and the surrounding herbaceous fields offer limited nesting and feeding habitat for birds. However, Fill Area 1 is often flooded periodically throughout the year. This flooding greatly limits its potential as a nesting site for birds and other wildlife.

Selection of Alternative B would not result in adverse impacts to terrestrial wildlife resources.

4.4.1.3. Alternative C

Under Alternative C, TVA would deposit ash in Fill Area 2. This site is a 70-acre levee with a gravel road running down its center. Early successional plant communities exist along the margin of the levee, providing only limited habitat for wildlife. This habitat is abundant in the area and, therefore, the loss of habitat within Fill Area 2 would be insignificant. Under Alternative C or D, Fill Area 4 may be used to reclaim dredge fill material stockpiled on the site. This site consists primarily of sparse weedy vegetation with limited wildlife value. Approximately 6 acres of dense black and sandbar willows and 10 acres of early successional plant communities offer some wildlife habitat. Early successional habitat is abundant in the area, and the wildlife that uses this area is common and regionally abundant. Therefore, the loss of habitat within Fill Area 4 would be insignificant.

4.4.1.4. Alternative D

Under Alternative D, TVA would deposit ash in Fill Area 3. To make this site suitable for ash storage, TVA would construct dikes to prevent flooding in this area during high-water events.

Of the four potential fill areas, Fill Area 3 contains the greatest amount of forested habitat. The forest is comprised of second-growth hardwoods with a few large cottonwood trees. Thickets and early successional habitats are also common in Fill Area 3.

Under Alternative D, the habitat in this site would be removed, which would adversely impact the only known breeding population of painted buntings in Tennessee. This site is a popular destination for local and regional birding organizations due to the presence of the buntings. If this site is selected, the following measures are recommended:

(1) Maintain forested and thicket habitats in the northeastern portion of Fill Area 3.

(2) Plant additional vegetation in the northeastern portion of Fill Area 3 to promote the development of thickets in the existing early successional habitats.

By using these mitigation measures, TVA would minimize impacts to painted buntings and other wildlife in Fill Area 3 to insignificance.

4.4.1.5. Alternative E

If Alternative E were enacted, dredged ash would be excavated from the east pond, dried, and hauled to an off-site commercial municipal solid waste landfill for disposal. This action would not result in adverse impacts to terrestrial wildlife resources.

4.4.1.6. Alternative F

Alternative F is a combination of two or more of Alternatives B through E. Impacts incurred by choosing Alternative F would be a combination of those discussed in Alternatives B

through E. By implementing the mitigation measures mentioned above, this action would not be expected to result in adverse impacts to terrestrial wildlife resources.

4.4.2. Plants

4.4.2.1.Alternative A

Under the No Action Alternative, ash would continue to be distributed to the east pond. There would be no impacts to terrestrial plant communities occurring within the boundary of the ALF.

4.4.2.2.Alternative B

Since there are no uncommon terrestrial plant communities associated with Fill Area 1, under the Action Alternatives B1 and B2, there would be no significant impacts to terrestrial plant communities. It would be important that the revegetation of the area be made with native plants.

4.4.2.3.Alternative C

Since there are no uncommon terrestrial plant communities associated with Area 2, under Action Alternative C, there would be no significant impacts to terrestrial plant communities.

4.4.2.4.Alternative D

Under Action Alternative D, there would be some disturbance to bottomland hardwood plant communities within Area 3. However, these are not considered to be uncommon terrestrial communities, and they are already highly disturbed. No significant impacts to these communities are expected.

4.4.2.5.Alternative E

Under Action Alternative E, there would be no impacts to terrestrial plant communities if the east pond is dredged and ash hauled off site.

4.4.2.6.Alternative F

The impacts of combinations of Alternatives B through E would be insignificant, since the individual impacts of each of these alternatives has been determined to be none or insignificant.

4.4.3. Threatened and Endangered Species (Animals)

4.4.3.1.Alternative A - No Action Alternative

Under the No Action Alternative, the actions for ash disposal and utilization would not take place. Fill Areas 1, 2, 3, and 4 would not be altered and, therefore, plant succession would continue. The second-growth bottomland forests would continue to grow into mature forests. However, ash would eventually fill the east pond, which would reduce its use by waterfowl and wading birds in the area.

4.4.3.2.Alternative B

Under Alternative B, TVA would deposit ash in Fill Area 1. This site does not meet the habitat requirements for barking tree frogs, Bewick's wrens, cerulean warblers, lark sparrows, eastern big-eared bats, and Indiana bats. The forested area contains well-drained, sandy soils that do not hold water for extended periods. Barking tree frogs prefer habitat with standing water situated within cypress or sweetgum swamps. This habitat does not exist in Fill Area 1. Cerulean warblers nest in large forest blocks with small openings. The forest in Fill Area 1 does not meet this condition. Roosting and/or hibernation sites for eastern big-eared bats and Indiana bats are not found in Fill Area 1. Summer feeding and/or maternity sites are also not found or are of poor quality in Fill Area 1.

Alligator snapping turtles likely occur in the waters surrounding Fill Area 1. They are known to nest on sandy mounds and sandbars, but nest site placement does not appear to be particularly selective (Ewert, 1976). The addition of dikes to Fill Area 1 would not eliminate nesting habitat for alligator snapping turtles. Suitable nesting areas for this species are common in the vicinity.

No potential nesting trees of adequate size exist within Fill Area 1; therefore, bald eagles and Mississippi kites are not expected to nest in the area. Alternative B would not result in impacts to these species.

Several interior least tern nesting colonies exist on sandbars in the Mississippi River. Least terns prefer sandbars that are protected from predators by being surrounded by water. Fill Area 1 has never been known to have an active tern colony. The closest known tern colony is ~2.4 miles from Fill Area 1. Since Fill Area 1 is part of a peninsula, predators have access to the area from the mainland. Fill Area 1 floods periodically throughout the year and receives high levels of disturbance from commercial and recreational boating in Lake McKellar. These factors make Fill Area 1 an unlikely location for least tern nesting. Selection of Alternative B would not impact interior least terns.

4.4.3.3.Alternatives C and D

Under Alternative C, an ash fill would be constructed in Fill Area 2. Habitats in this area are not suitable for most species listed in Table 3-2. However, eastern slender glass lizards and northern pine snakes may be present in Fill Area 2. During ash deposition to the area, glass lizards and pine snakes would be eliminated from the area, but extensive habitat for these species exists in the immediate area. No impacts are expected to listed species if Alternative C is chosen.

Under Alternative D, an ash fill would be constructed in Fill Area 3. This area does not contain suitable habitat for alligator snapping turtles, cerulean warblers, lark sparrows, least terns, eastern big-eared bats, and Indiana bats. As to the federally listed species, least tern and Indiana bats, TVA determined that these alternatives would have "no effect" on these species.

Bald eagles and Mississippi kites have nested in Fill Area 3 in recent years. According to a local bird enthusiast familiar with the area, bald eagles have not nested in Fill Area 3 since 2001. The birds constructed a nest 0.5 mile north of the nest's original location. The newer nest is located on the opposite bank of the long, narrow embayment, just northwest of ALF. This nest was active in 2003. The birds were not successful and abandoned the nest in

2004. This nest was taken over by a pair of great horned owls in 2005. The nest at this site ultimately fell from the tree during summer 2005.

Bald eagles attempted to construct two other nests ~0.7 mile southwest of Fill Area 3 before 2001. Each attempt was unsuccessful, resulting in the eagles abandoning these nest sites. No active bald eagle nests are currently known from the project area. The site was also examined for Mississippi kite nests; none were located during field investigations.

Because an abandoned eagle nest was reported ~1,600 feet north of Fill Areas 2 and 3, informal consultation with the USFWS Cookeville, Tennessee, office was initiated. The Bald Eagle Recovery Plan Guidelines (USFWS, 1989) recommend that a protective buffer zone be placed around an abandoned bald eagle nest for five consecutive years. This buffer is comprised of a primary zone (0 feet to 750-1,500 feet) and a secondary zone (750 feet to 5,280 feet). During discussions with the USFWS, it was noted that the eagles have abandoned the nest for more than two consecutive years, that high levels of human disturbance (barge traffic and coal handling operations) already exist in the area, that the nest is not in direct line of site to Fill Areas 2 and 3, and the proposed action is not within the primary buffer zone.

TVA endangered species biologists examined all former bald eagle nest sites on March 10. 2006. They found a nest currently exists on the peninsula approximately 0.4 miles north of the preferred disposal site. However, they found no evidence of eagles or nesting activity during the current breeding season at the site; no feathers, and no bird droppings. No new nest sites were found in forested areas surrounding ALF during the 2006 breeding season. Given the existing level of human activity nearby and the lack of breeding birds using the nest site, operation of the ash disposal site would not result in adverse impact to the bald eagles. The USFWS concurred with these findings and the informal consultation process was completed.

Habitat for all remaining species found in Table 3-2 exists in Fill Area 3. Because suitable habitat for these species is fairly common throughout ALF and adjacent areas, direct and cumulative impacts are not expected to affect their populations.

Under Alternative C or D, Fill Area 4 may be used to reclaim dredge fill material stockpiled on the site. Fill Area 4 does not meet the habitat requirements for barking tree frogs, alligator snapping turtles, bald eagles, cerulean warblers, lark sparrows, interior least terns, Swainson's warbler, Mississippi kites, eastern big-eared bats, Indiana bats, and striped whitelips.

Habitat for all remaining species exists in Fill Area 4. Because suitable habitat for these species is fairly common throughout ALF and adjacent areas, direct and cumulative impacts are not expected to affect their populations.

4.4.3.4.Alternative E

No listed species are expected to be impacted negatively if Alternative E is chosen. Ash would be transported off site.

4.4.3.5.Alternative F

Since Alternative F is a combination of two or more of Alternatives B through E, see the above discussions corresponding to these alternatives.

4.4.4. Threatened and Endangered Species (Plants)

4.4.4.1.Alternative A

Under the No Action Alternative, ash would continue to be distributed to the east pond. There would be no impacts to sensitive plant resources, since there are no known threatened and endangered plant species within 5 miles of the project site.

4.4.4.2.Alternatives B Through F

Since there are no known threatened or endangered plant species existing within 5 miles of the project, there would be no impacts to threatened and endangered plant species for any of the five Action Alternatives. It should be noted that there are two species that were found in Area 4 that are considered to be state records (University of Tennessee Herbarium Web site, http://tenn.bio.utk.edu/index.html). These plants are *Dracopsis amplexicaule*, clasping coneflower and *Helianthus petiolaris*, prairie sunflower. Both of these species are common within their ranges. It is thought that their presence within Area 4 is adventive, and they would not persist within the flora of this area.

4.5. Aquatic Ecology

4.5.1. Aquatic Life

No direct effects to aquatic resources are associated with this project, due to the absence of aquatic habitats in the project area. Indirect effects to streams, such as the Mississippi River and McKellar Lake, outside the project area from storm water runoff are possible but would not be significant with the use of BMPs designed to control siltation and groundwater contamination.

4.5.2. Aquatic Threatened and Endangered Species

4.5.2.1. No Action Alternative

The No Action Alternative is the most likely to result in indirect and/or cumulative effects to the blue sucker. The No Action Alternative is the least desirable alternative because as the east pond is filled to capacity, it would become more susceptible to releases of contaminated discharges to McKellar Lake, potentially adversely affecting aquatic resources in McKellar Lake and the Mississippi River.

4.5.2.2. Alternatives B Through E

Due to the nature of the project (ash disposal and management), no direct effects to populations of the blue sucker or its habitat would likely occur as a result of any of the alternatives currently under consideration. However, both McKellar Lake and the adjacent reach of the Mississippi River in Shelby County are listed as 303d streams by TDEC. These water bodies are contaminated by a variety of pollutants, including PCBs, chlordane, dioxin, organic enrichment, and siltation (TDEC, 2004). Further degradation of blue sucker

habitat could result from runoff from the east pond at ALF or from soil-disturbing activities adjacent to McKellar Lake and the Mississippi River.

All Action Alternatives currently being considered involve excavation and/or dredging of the ash pond and placement/disposal of this material at one or more of the identified sites. The likelihood of indirect and/or cumulative effects occurring as a result of these proposed actions would be minimized by the implementation of BMPs designed to control siltation and groundwater contamination. With proper implementation of these practices, no effects to the blue sucker or its habitat in the Mississippi River would occur.

4.6. Wetlands

4.6.1. Alternative A

There would be no impacts to existing wetlands under this alternative.

4.6.2. Alternatives B Through D

Alternative B would result in the fill of Wetland W1 and would be subject to federal Section 404 Clean Water Act permit requirements as well as state Section 401 water quality certification. Under Alternative C or D, Area 4 may be used to reclaim dredge fill material stockpiled on the site and there are no wetlands in this area.

4.6.3. Alternative E

Under Alternative E, ash would be transported off site and, therefore, there would be no impacts to wetlands if this alternative were utilized.

4.6.4. Alternative F

Since Alternative F is a combination of two or more of Alternatives B through E, see the above discussions corresponding to these alternatives.

4.7. Floodplains

4.7.1. Alternative A

Under this alternative, no new construction would take place within the Mississippi River 100-year floodplain, and current conditions would not change. Any proposed development in the floodplain would be reviewed in advance by TVA to ensure that floodplain impacts would be minimized.

4.7.2. Alternative B

Under Alternatives B1 and B2, an ash disposal area would be constructed within the limits of the Mississippi River 100-year floodplain and is, therefore, subject to compliance with Executive Order (EO) 11988. An ash disposal area is not considered a repetitive action in the 100-year floodplain. Therefore, it would be necessary to evaluate alternatives to the proposed floodplain location that would either identify a better site or document that there is no practicable alternative to locating the ash disposal area within the limits of the 100-year floodplain. Under this EA, alternative sites are being evaluated that would not involve construction in a floodplain. At this junction, TVA's preferred alternative (Alternative C) is

one that does not involve activities in the 100-year floodplain. By completing this EA, TVA would also be complying with EO 11988. Either one of the nonfloodplain sites would be selected at the completion of this EA, or support would be provided for construction of this fill area within the 100-year floodplain. If this alternative were selected, a levee would be constructed around the fill area to prevent flooding. The construction of Fill Area 1 in the Mississippi River 100-year floodplain would not increase the incidence of flooding or flood damage potential, which would fulfill the requirements of EO 11988.

4.7.3. Alternative C

In Alternative C, ash would be transported to Fill Area 2, which is located behind the Ensley Levee at the north end of the Pidgeon Industrial Park. The top of the levee varies from 237-239 msl along the length of the fill. Therefore, this area is not within the Mississippi River 100-year floodplain. Fill Area 2 had been previously filled with ash from ALF. The existing ground elevation at the toe of the fill is 214+/-. This area would also be above the 100-year flood elevation within the levee. Therefore, the placement of ash in Fill Area 2 would not involve siting in the 100-year floodplain, which would be consistent with EO 11988.

4.7.4. Alternative D

The anticipated impacts associated with Alternative D would be similar to those under Alternative B.

4.7.5. Alternative E

Under Alternative E, the ash would be disposed of in an existing landfill. The landfill under consideration is not located within the 100-year floodplain. Therefore, the placement of ash in the landfill would not involve siting in the 100-year floodplain, which would be consistent with EO 11988.

4.7.6. Alternative F

Under Alternative F, the impacts of combinations of Alternatives B through E would be similar to those identified under the individual alternatives. For any combination involving Alternative B or D, TVA would document that there was no practicable alternative to siting the facilities in the 100-year floodplain. The placement of ash in Fill Area 2 or 3 or the landfill (Alternatives C and E) would not involve siting in the 100-year floodplain. The floodplain impacts of any of the alternatives have been determined to be insignificant. Therefore, the floodplain impacts of any combination of these alternatives (Alternative F) would be insignificant, which would be consistent with EO 11988.

4.8. Solid Waste

4.8.1. Alternative A

Under Alternative A, the No Action Alternative, ALF could continue to sluice fly ash and slag to the existing east ash pond for less than two years and remain in compliance with NPDES permit requirements. Although ALF does currently sell a large amount of the boiler slag produced at the plant, prudent management requires that TVA develop an ash management strategy that would allow the plant to continue to operate with or without ash marketing and remain in compliance with its NPDES permit. Continued plant operation

requires a plan that would allow for at least 2.3-3.1 million tons of ash disposal/utilization to be initiated by 2006. This alternative does not meet those requirements even with the continued pursuit of other small offsite structural fill projects. From a power production standpoint, this is the least desirable alternative.

4.8.2. Alternative B

Development of Fill Area 1 under either Alternative B-1 or B-2 would consist of construction of a diked area that would receive either sluiced or hydraulically dredged fly ash from ALF. Fill Area 1 is property within the existing ALF plant reservation property and represents the only undeveloped property on the plant reservation. Construction of the clay dikes and clay liners for the project would require low-permeability material. A suitable borrow site for obtaining the clay has not been identified within a reasonable distance from the plant. Since the site is currently almost inaccessible to truck traffic, construction of a haul road to the site would be required. Frequent flooding of the area would also impact construction schedules.

Sluice lines or dredge lines would need to be run to the site. The only landside routing of these lines would require easements from adjacent property owners. These lines would need to be constructed to withstand floodwaters by either burying them or elevating them above flood elevations. If the area were to discharge directly to McKellar Lake, a NPDES permit would be obtained for the outfall. If it were necessary to pump the effluent back to the east ash pond, a pumping station and electric power source would be needed, and return sluice lines would have to be constructed, probably following the same route as the sluice or dredge lines.

Preliminary estimates for the capacity of this area indicate that it would hold only about 1.0 million yd^3 of ash. Therefore, this alternative, by itself, does not provide sufficient capacity for the 15- to 20-year planning horizon.

4.8.3. Alternative C

The property under consideration is under the control of the Port Commission. Preliminary volume estimates indicate that development of this site with ash would utilize about 2.3 million yd3 of ash. Upon completion, the area would be used as part of an intermodal freight transfer facility to support development of the Pidgeon Industrial Park and Harbor. Solid waste permitting of this site would be either Class II (with waivers) (Chapter 1200-1-7-.02-(1)(c)1(ii)) or Permit-by-Rule for ash utilization (Chapter 1200-1-7-.02-(1)(c)(1)(ii)). Construction and operation of the site would comply with all stipulations of these permit requirements.

This site is on the landside of the Ensley Levee and during 1991-1992, ~700,000 tons of ALF ash was excavated from the east and west ash ponds for placement to reinforce the toe of the levee. A Class II solid waste disposal permit (Permit No. IDL 79-106-0077) was issued to the Port Commission for the project, which was completed in cooperation with TVA and the USACE. It is possible that this permit could be updated and amended to support this project, or a new permit could be applied for by the Port Commission.

The site may be prepared by stripping as much usable cover material from the original ash fill as possible to conserve cover material. Ash excavated from the ponds or dredge cell at ALF would be hauled to the site in trucks. Quantities of ash available from the east and west ash ponds are shown on Table 2-1.

All trucks would need to be tarped and have sealed tailgates to prevent ash spillage. At other sites where TVA has moved large quantities of ash, it has been necessary to use some combination of wheel washes and rock runouts to clean tires prior to trucks leaving the ash loading area and water trucks and sweeper trucks to prevent tracking and airborne particulates. The combination selected varies depending on weather conditions, road conditions, and traffic.

Initial excavation of ash from the west ash pond would be done under "zero flow" conditions. Once the required volume of ash was removed and if sluice lines were rerouted to that pond, the pond would be required to meet an FWV of 79,650 yd^3. The NPDES-permitted suspended solids limits would be maintained using either curtains or divider dikes. The pond would also be subject to all other required monitoring and effluent limits specified in the NPDES permit. Excavation of ash from the east pond would either be from the existing dredge cell or from within the pond after sluice lines were rerouted to the west ash pond.

Most construction activities would be conducted only during the dryer months of April through November. Estimated tonnage would be about 100,000 tons/month for 23 months. Trucks would haul 25 tons/load at 18-25 percent moisture up to six days/week, 32 weeks/year. This would be a total of about 167 round trips per day. The truck route would exit ALF to the Ensley Levee berm with a total round trip of less than 2 miles.

Cover material would consist of reclaimed dredge spoil material from Fill Area 4, stockpiled cover material, and potentially some excess fill material from another area within the Pidgeon Industrial Park. Utilizing Fill Area 2 would be beneficial because it already contains large quantities of ash, has enough capacity to extend the life of the existing plant ash disposal facilities significantly, has previously been permitted for a similar project, does not require development of a new "borrow" site and the end use supports the master plan for development of the Pidgeon Industrial Park. This is the preferred alternative.

4.8.4. Alternative D

Development of Fill Area 3 under either Alternative D-1 or D-2 would consist of construction of a diked area that would receive excavated or hydraulically dredged fly ash from ALF. The property under consideration is under the control of the Port Commission. Upon completion, the area would be used as part of an intermodal freight transfer facility to support development of the Pidgeon Industrial Park and Harbor. Solid waste permitting of this site by the Port Commission would be either Class II (with waivers) (Chapter 1200-1-7-.02-(1)(c)1(ii)) or Permit-by-Rule for ash utilization (Chapter 1200-1-7-.02-(1)(c)(1)(ii)). Construction and operation of the site would comply with all stipulations of these permit requirements.

Construction of the clay dikes and clay liners for the project would require low-permeability material. A suitable borrow site for obtaining the clay has not been identified within a reasonable distance from the plant. If ash were dredged from the east ash pond, dredge lines would need to be run to the site. If the area were permitted to discharge directly, an NPDES permit would be required. The water would probably be directed into the adjacent cooling water discharge channel from ALF. At least two discharge weirs would be constructed. If it were necessary to pump the effluent back to the east ash pond, a pumping station and electric power source would be needed, and return sluice lines would have to be constructed, probably following the same route as the dredge lines.

If excavated ash were placed within the dikes, material could be excavated either from the west ash pond, the east ash pond, from the dredge cell within the east ash pond, or from some combination of these locations.

Preliminary estimates for the capacity of this area indicate that it would hold only about 1.0 million yd^3 of ash. Therefore, this alternative, by itself, does not provide sufficient capacity for the 15- to 20-year planning horizon.

If development of Fill Area 3 were pursued, a borrow site would have to be identified, and this environmental review would be revised to include the additional impacts of developing the borrow site and truck traffic associated with hauling borrow material for dike construction.

4.8.5. Alternative E

Hauling to a commercial municipal landfill would require that TVA excavate a minimum of 154,000 tons per year (dry basis) from a dredge cell wholly contained within the east ash pond. Material would be dredged from the main ash pond during the wetter, winter months when ash is more difficult to excavate, dewater, load, and haul. Material would be excavated, dewatered, loaded, and hauled April through November (during the dryer months). Trucks would haul 25 tons/load at 18-25 percent moisture five days/week, 32 weeks/year. Total tonnage hauled would be 192,500 tons/year (assuming 25 percent moisture). This would result in 48-50 truckloads/day (7,700 truckloads/year, 240 loads/week).

All trucks would need to be tarped and have sealed tailgates to prevent ash spillage. At other sites where TVA has moved large quantities of ash, it has been necessary to use some combination of wheel washes and rock runouts to clean tires prior to trucks leaving the ash loading area and water trucks and sweeper trucks to prevent tracking and airborne particulates. The combination selected varies depending on weather conditions, road conditions, and traffic.

The location under consideration would be the waste management landfill in Tunica, Mississippi. If available, a closer disposal facility could also be utilized. Hauling ash to a commercial municipal landfill would not be considered economically viable as a long-term option, primarily because of cost. This option would only be economical as a short-term, emergency option.

4.8.6. Alternative F

If a combination of Alternatives B through E were chosen, it would require more intensive operation and management oversight for multiple sites and would require more design engineering and permitting effort. While the impacts of this would be insignificant, from an economic standpoint, this would not be the most desirable alternative.

4.9. Cultural Resouces

4.9.1. Alternative A

There would be no impacts to Cultural Resources because the No Action Alternative does not involve any new construction activities.

4.9.2. Alternatives B Through F

The one previously recorded site 40SY566 (see Section 3.9) and the newly identified portions of site 40SY566 located within the APE are recommended as ineligible for listing on the NRHP. TVA has determined that the proposed undertaking would not have the potential to affect any historic properties that are potentially eligible, eligible, or currently listed on the NRHP. See Appendix A for concurrence from the Tennessee State Historic Preservation Officer with these findings.

4.10. Prime Farmland

There are no significant impacts to farmland associated with implementation of any of the alternatives.

4.10.1. Alternative A

Farmland would be unaffected by taking no action.

4.10.2. Alternative B

Because no farmland has been identified in Fill Area 1, neither Action Alternative B-1 or B-2 would affect farmland by construction of an ash disposal site.

4.10.3. Alternative C

Construction of an intermodal freight transfer facility on Fill Area 2 would affect about 15 acres of land with prime farmland properties. Impacts from this action would be insignificant because of the minimal acreage affected and because the land is zoned for industrial use. The land is currently leased to farmers until the time it is sold to industry for development.

4.10.4. Alternative D

About 30 acres of land that could support quality crops or forestland would be permanently disturbed by using this area for ash disposal. However, impacts to farmland would be insignificant because of the small acreage involved.

4.10.5. Alternative E

No impacts to farmland are expected by hauling the ash to a commercial landfill.

4.10.6. Alternative F

Any combination of actions would result in no or insignificant impacts to farmland.

4.11. Natural Areas

4.11.1. Alternative A - No Action Alternative

Under Alternative A, the No Action Alternative, the proposed activity would not occur, and ash would continue to be sent to the east ash pond at ALF. No impacts to natural areas are expected as a result of the selection of this alternative.

4.11.2. Action Alternatives B Through F

Under Action Alternatives B through F, the ash would be dredged or excavated from the east ash pond and moved to fill areas nearby. Alternatives B through F would be an extension of ongoing activities on the site. President's Island Wildlife Management Area and Riverside (M.L. King) Park are located sufficient distances (0.9 and 2.9 miles, respectively) and would not be impacted by these alternatives. Natural areas immediately adjacent to the east pond are T.O. Fuller State Park (0.1 mile) and Chucalissa Village State Archaeological Area (0.1 mile). TVA's containment measures would limit off-site movement of ash and other debris; therefore, dredging, excavation and disposal of ash would not result in direct, indirect, or cumulative effects to nearby natural areas.

4.12. Visual

Consequences of the impacts to visual resources are examined based on changes between the existing landscape and the landscape character after alteration, identifying changes in the landscape character based on commonly held perceptions of landscape beauty and the aesthetic sense of place.

4.12.1. Alternative A - No Action Alternative

Under the No Action Alternative, TVA would continue to operate the existing ash ponds, and the existing landscape character would not be affected.

4.12.2. Alternative B

Under Alternative B, TVA would construct clay dikes around Fill Area 1. This action, which would result in a discernable change in topography from creation of the dikes, would alter the existing visual character of the proposed fill area. The existing landscape character has a relatively high capacity to accept further modifications without adversely affecting the scenic attractiveness or scenic integrity. Views of the fill area would be available from within the foreground viewing distance to boating traffic on McKellar Lake and at the industries that are located to the north and east. However, boating traffic on McKellar Lake consists, primarily, of large vessel traffic to and from the industrial ports that are located along its banks. Action Alternatives B-1 and B-2 would not significantly impact the existing visual resources.

4.12.3. Alternative C

Under Alternative C, about 2.3 million yd3 of ash would be utilized as part of an intermodal freight transfer facility to support development of the Pidgeon Industrial Park and Harbor. Ash would be removed from the existing ash ponds and transported to Fill Area 2 via dump trucks. This proposed action would result in a discernable change in topography visible from positions previously described as the existing levee is expanded. Views of the associated construction activity and traffic would be visible from within the foreground viewing distance at positions along Riverport Road. However, traffic along this roadway is generally very low and consists primarily of employees and visitors to the surrounding industrial areas. Motorists would have brief views of minimal visual discord during periods of ash transportation. Views of this proposed activity would not deviate from the existing landscape character. Therefore, Action Alternative C would not significantly affect the existing visual resources.

4.12.4. Alternative D

Under Alternative D, TVA would construct clay dikes in the lower elevations of Fill Area 3. Impacts to visual resources would be similar to those discussed in the previous two alternatives. However, views would be limited from Riverport Road due to existing mature vegetation and the T.E. Maxson wastewater treatment facility, which obscure views to the west from the roadway. Motorists traveling northward along the route would have views of the proposed fill area only briefly and in context with the surrounding industrial setting. Implementation of Action Alternative D would not significantly impact the existing visual resources.

4.12.5. Alternative E

Under Alternative E, TVA would collect the ash material from the existing dredge cell and transport the material to a location off site. This would occur on a two- to three-year cycle. Impacts to existing visual resources would remain similar to those discussed in previous sections with the exception that residents and motorists in the plant vicinity and along the haul route would have foreground views of minor visual discord associated with an increase in heavy truck traffic during times of ash disposal. This proposed alternative would not significantly impact the existing visual resources.

4.12.6. Alternative F

Under Alternative F, TVA would address the reduction of an available ash disposal area by a combination of the previously discussed Action Alternatives. This would result in only minor visual discord, which would be associated with the potential for increases in heavy truck traffic. The impacts to visual resources resulting from a combination of Alternatives B through E would be insignificant.

Collectively, the removal of ash material from existing ponds and disposal on site or off site would result in an increase in the activity of equipment and personnel within the vicinity of the existing ash ponds and along the Ensley Levee. Activity associated with the Action Alternatives would be visible to motorists traveling Riverport Road, to employees of ALF, to employees of other industries in the near vicinity, and to boaters on McKellar Lake. The number and duration of views available would generally be very low, and impacts associated with any of the Action Alternatives would not result in an adverse impact to the existing visual resources.

4.13. Seismology

4.13.1. Alternative A

Under the No Action Alternative, TVA would continue to operate the existing ash ponds, and there would be no difference in the earthquake risk.

4.13.2. Alternatives B Through F

For Alternatives B through D, there would be a potential of earthquake impacts. These impacts would vary depending on the selected design for the disposal alternative. TVA would mitigate earthquake impacts by complying with any regulatory and permitting requirements that apply to the seismic design of the selected disposal alternative. Under Alternative E, TVA would place ash in existing landfills, and there would be no difference in the earthquake risk. Under Alternative F, the impacts of combinations of Alternatives B

through E would be similar to those identified under the individual alternatives. As long as the recommended mitigation measures were implemented, the impacts to seismology from Alternatives B through F would be insignificant.

4.14. Socioeconomics and Environmental Justice

4.14.1. Alternative A

Under the No Action Alternative, TVA would continue to operate the existing ash ponds, and there would be no impacts to socioeconomics or environmental justice.

4.14.2. Alternatives B Through F

Due to the nature of the project (i.e., handling, transfer, disposition of ash), impacts on employment, income, population, and community services and infrastructure would be negligible. Each of the proposed alternative actions involve on-site handling, transfer, and/or continued storage of ash on an expansive area reserved for heavy industry and having a substantial property buffer area. According to the 2000 Census, the census tract that encompasses the industrial site on which the ALF plant is located and the ash would be managed has no residents. The nearest residences are ~3 miles from the site. Therefore, these proposed on-site actions would not be noticed by and would have no impact on residents of the surrounding area.

Alternatives E and F involve transport or potential transport of ash material off site for disposal at the Waste Management Tunica, Mississippi, Sanitary Landfill. The major segment of the proposed hauling route is US 61, a major arterial used for commercial traffic that has served as the major access route between Memphis and the predominately agricultural and sparsely populated Mississippi Delta portion of northwest Mississippi.

The designated hauling corridor traverses southwest Shelby County, Tennessee, the western portion of Desoto County, Mississippi, and the northeastern corner of Tunica County, Mississippi, where it would end. This corridor cuts through population areas that differ markedly in racial and income makeup. Desoto County contains the lowest proportion of black population and low-income population among all labor market counties. Tunica County has the highest percentage of black and low-income population within the labor market area.

Specifically, population of the portion of the corridor within the urbanized area of southwest Shelby County is disproportionately black and low-income; however, most of the residential areas do not abut the highway right-of-way. The portion of the hauling corridor in Desoto County is predominantly white with a relatively low percentage of low-income residents. The population within the Tunica County portion of the corridor is disproportionately black and low income. This portion of the corridor, however, is rural, predominantly agricultural, and sparsely populated. Hauling trips would be dispersed throughout the day, would add somewhat to the existing highway usage, would fit within normal and familiar traffic patterns, and would not be noticeable to residents along the way. Therefore, the proposed hauling of ash to the proposed off-site location for disposal would not adversely impact area residents and would not disproportionately impact disadvantaged populations.

Using ash as fill material in Alternatives C, D, and potentially F would contribute to future planned use of the harbor as a facility for intermodal transportation. This proposed action

would be in line with the eventual development and improvements envisioned for the area that, in turn, would contribute to the region's economic health. Therefore, use of ash material in this way would have a beneficial impact.

4.15. Transportation

4.15.1. Alternative A

Under the No Action Alternative, TVA would continue to operate the existing ash ponds, and there would be no additional effects to transportation.

4.15.2. Alternative B

Fill Area 1 is located within the property boundaries of ALF. Since the site is currently almost inaccessible to truck traffic, construction of a haul road to the site would be required. The haul road would be partially on TVA property but would require easements from adjacent property owners. However, there would be no significant impacts on local traffic or facilities.

4.15.3. Alternatives C and D

The Port Commission owns Fill Areas 2 and 3. The route taken from ALF to these areas would be less than a 2-mile round trip. The majority of traffic in this area is industrial based, and the roads in the proposed areas are designed for heavy industrial traffic. The disposal of dredged ash in these areas would have no significant impacts on local traffic or facilities.

4.15.4. Alternative E

By hauling dredged ash to the Mississippi landfill, there would be minor impacts to the traffic and roads due to the additional generation of traffic during the disposal periods. It is proposed that trucks would haul the dredged ash for 32 weeks out of the year, April through November. This avoids the wetter portions of the year when the ash is more difficult to excavate and dewater. There would be ~50 trucks per day delivering the dredged ash to the landfill, five days per week. The disposal facility operates 10 hours per day. Assuming that deliveries are evenly distributed, this would average only five additional trucks per hour on the highway systems. Bowdre Road currently supports only 80 vehicles per day, and the assumption can easily be drawn that the majority of the traffic traveling this route is going to or from the landfill. In the long term, operation of the off-site disposal of dredged ash would not generate any noticeable increases in traffic for the roads along the route to the landfill facility. The roads are fully capable of absorbing this additional traffic with no drop in the existing level of service currently provided to the road users. Trucks would not be loaded beyond the legal load limits and would meet all safety standards, and hauling would comply with all federal, state, and local ordinances. The potential traffic impact for this operation would be insignificant.

4.15.5. Alternative F

Any combination of actions would result in no or insignificant impacts to transportation.

4.16. Summary of TVA Commitments and Proposed Mitigation Measures

The summary of commitments and proposed mitigation measures for Alternatives A through E are presented below. Alternative F is not included because Alternative F is a combination of two or more of Alternatives B through E, and the commitments would be the same as each individual alternative.

4.16.1. Routine and Compliance Measures

4.16.1.1. Alternative A

There are no routine or compliance measures necessary under Alternative A.

4.16.1.2. Alternative B

- Actions involving Wetland W1 would be subject to federal Section 404 Clean Water Act permit requirements as well as state Section 401 water quality certification.

- A storm water construction general permit would need to be obtained prior to commencement of construction for Fill Area 1.

- A storm water pollution prevention plan would be developed (or augmented), which would include 1) appropriate BMPs to minimize or eliminate sediment loading in runoff from the construction area, including any borrow areas, 2) measures to ensure that storm water runoff from the site would be controlled in sedimentation basins if the total disturbed area at any given time is greater than or equal to 10 acres; or a sediment trap or equivalent control measures would be used if the total disturbed area at any given time is be less than 10 acres, and 3) all erosion prevention and sediment controls to be put in place, functional, and properly maintained before start of construction.

- During reclamation of ash from an active ash pond, visual inspections of the outfall for turbidity, color, or other objectionable matter would be conducted, and all NPDES permit conditions/requirements would be met.

- In accordance with 40 CFR 112, drums/tanks 55-gallons or larger containing a petroleum product (e.g., oil, gas, or diesel) would have secondary containment.

- The discharge from Fill Area 1 ash pond or the dredge sluice water would either be returned to the current NPDES-permitted east (active) ash pond for discharge or be discharged through a new NPDES-permitted discharge to McKellar Lake.

- All containment structures, including liners, leachate collection systems, and surface water control systems, would be designed and constructed to resist the maximum horizontal acceleration (in this case, 0.71 g) in lithified earth material. The ground motions used for design would be adjusted depending on the type of foundation conditions.

- If necessary, wet suppression would be used on open-construction areas and unpaved roads to reduce fugitive dust.

- All trucks would need to be tarped and have sealed tailgates to prevent ash spillage.

- TVA would mitigate earthquake impacts by complying with any regulatory and permitting requirements that apply to the seismic design of the selected disposal alternative.

4.16.1.3. Alternative C

- A storm water construction general permit would need to be obtained prior to commencement of soil disturbance in Fill Area 2 and/or 4.

- A storm water pollution prevention plan would be developed (or augmented), which would include appropriate BMPs to minimize or eliminate sediment loading in runoff from the construction area, including any borrow areas.

- Storm water runoff from the site would be controlled in sedimentation basins if the total disturbed area at any given time is greater than or equal to 10 acres; otherwise, a sediment trap or equivalent control measures would be used.

- All erosion prevention and sediment controls would be in place and functional before start of construction and would be properly maintained.

- Initial excavation of the west ash pond would be done under “zero flow” conditions, reducing the risk of impacting surface waters.

- If the west ash pond were reactivated, TDEC would be notified. The FWV, water quality monitoring, and effluent limitations specified in the NPDES permit would be met.

- Fly ash would be dewatered such that the ash moisture content would be reduced to approximately 18 to 25 percent, and there would be minimal free water.

- In accordance with 40 CFR 112, drums/tanks 55-gallons or larger containing a petroleum product (e.g., oil, gas, or diesel) would have secondary containment.

- Prior to placement of the ash, the ground cover material may be stripped and stockpiled; then the material would be replaced after the fill was completed.

- While the material was stockpiled, it would be temporarily stabilized with vegetative cover, mulch, and/or other suitable BMPs.

- During placement of the ash and compaction, the activity would be sequenced to minimize the exposure time of graded or denuded areas.

- Areas of the completed phase would be stabilized in accordance with a project SWPP.

- Permanent stabilization of the fill area would be done with a permanently stable, noneroding surface in accordance with the construction general permit requirements.

- All containment structures including surface water control systems would be designed and constructed to resist the maximum horizontal acceleration (in this case, 0.71 g) in lithified earth material. The ground motions used for design would be adjusted depending on the type of foundation conditions.

- All trucks would need to be tarped and have sealed tailgates to prevent ash spillage.

- Wheel washes and rock runouts to clean the tires prior to trucks leaving the ash loading area and water trucks and sweeper trucks to prevent tracking and airborne particulates would be utilized individually or in combination as needed.

- During reclamation of ash from an active ash pond, visual inspections of the outfall for turbidity, color, or other objectionable matter would be conducted, and all NPDES permit conditions/requirements would be met.

- A Solid Waste Disposal Permit/Permit-by-Rule for ash disposal/utilization would be required for utilization of ash in Area 2.

- If necessary, wet suppression would be used on open-construction areas and unpaved roads to reduce fugitive dust.

- TVA would mitigate earthquake impacts by complying with any regulatory and permitting requirements that apply to the seismic design of the selected disposal alternative.

4.16.1.4. Alternative D

- A storm water construction general permit would need to be obtained prior to commencement of soil disturbance in Fill Area 3 and/or 4.

- A storm water pollution prevention plan would be developed (or augmented), which would include appropriate BMPs to minimize or eliminate sediment loading in runoff from the construction area, including any borrow areas.

- Storm water runoff from the site would be controlled in sedimentation basins if the total disturbed area at any given time is greater than or equal to 10 acres; otherwise, a sediment trap or equivalent control measures would be used.

- All erosion prevention and sediment controls would be in place and functional before start of construction and would be properly maintained.

- Initial excavation of the west ash pond would be done under “zero flow” conditions, reducing the risk of impacting surface waters.

- If the west ash pond were reactivated, TDEC would be notified. The FWV, water quality monitoring, and effluent limitations specified in the NPDES permit would be met.

- In accordance with 40 CFR 112, drums/tanks 55-gallons or larger containing a petroleum product (e.g., oil, gas, or diesel) would have secondary containment.

- During reclamation of ash from an active ash pond, visual inspections of the outfall for turbidity, color, or other objectionable matter would be conducted, and all NPDES permit conditions/requirements would be met.

- The discharge from Fill Area 3 ash pond or the dredge sluice water would either be returned to the current NPDES-permitted east or west ash pond (if the west ash pond is reactivated) for discharge or be discharged through a new, temporary NPDES-permitted discharge to the Mississippi River for the duration of the sluicing/dredging operation.

- All containment structures including surface water control systems would be designed and constructed to resist the maximum horizontal acceleration (in this case, 0.71 g) in lithified earth material. The ground motions used for design would be adjusted depending on the type of foundation conditions.

- A Solid Waste Disposal Permit/Permit-by-Rule for ash disposal/utilization would be required for utilization of ash in Area 3.

- If necessary, wet suppression would be used on open-construction areas and unpaved roads to reduce fugitive dust.

- All trucks would need to be tarped and have sealed tailgates to prevent ash spillage.

- Wheel washes and rock runouts to clean the tires prior to trucks leaving the ash loading area and water trucks and sweeper trucks to prevent tracking and airborne particulates would be utilized individually or in combination as needed.

- TVA would mitigate earthquake impacts by complying with any regulatory and permitting requirements that apply to the seismic design of the selected disposal alternative.

4.16.1.5. Alternative E

- In accordance with 40 CFR 112, drums/tanks 55-gallons or larger containing a petroleum product (e.g., oil, gas, or diesel) would have secondary containment.

- The ash would be transported in a manner that no fly ash or ash pond water would be released from the truck during transport.

- Trucks would not be loaded beyond the legal load limits, and would meet all safety standards, and hauling would comply with all federal, state, and local ordinances.

- All trucks would need to be tarped and have sealed tailgates to prevent ash spillage.

- Wheel washes and rock runouts to clean the tires prior to trucks leaving the ash loading area and water trucks and sweeper trucks to prevent tracking and airborne particulates would be utilized individually or in combination as needed.

4.16.2. Special Mitigation Measures

4.16.2.1. Alternative A

None

4.16.2.2. Alternative B

None

4.16.2.3. Alternative C

None

4.16.2.4. Alternative D

- Maintain forested and thicket habitats in the northeastern portion of Fill Area 3.
- Plant additional native vegetation in the northeastern portion of Fill Area 3 to promote the development of thickets in the existing early successional habitats.

4.16.2.5. Alternative E

There would be no special mitigation measures necessary under Alternative E.

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CHAPTER 5

5. LIST OF PREPARERS

5.1. NEPA Project Management

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Position:	Senior NEPA Specialist, TVA Environmental Stewardship and Policy, Chattanooga, Tennessee
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Involvement:	NEPA Compliance and Document Preparation

Diedre B. Nida

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Experience:	15 years Radio Chemical Laboratory Analyses; 4 years Environmental Engineering; 2 years Environmental Management; 3 years Environmental Impact Assessment
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5.2. Other Contributors

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Involvement:	Surface Water and Industrial Wastewater

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V. James Dotson

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Travis Hill Henry

Position:	Senior Terrestrial Zoologist, TVA Resource Stewardship, Knoxville, Tennessee
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P. Alan Mays

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Jason M. Mitchell

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Russell D. Smith

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Allan J. Trently

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Involvement:	Threatened and Endangered Species; Wildlife

Robert C. Wilson

Position:	Geographic Analyst, TVA Research & Technology Applications, Chattanooga, Tennessee
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Experience:	5 years in GIS and Mapping
Involvement:	Geographic Information System

CHAPTER 6

6. LIST OF AGENCIES AND PERSONS CONSULTED

Federal Agencies

United States Army Corps of Engineers, Memphis Office

Federal Wildlife Resource Agency, Cookeville Office

State Agencies

Memphis and Shelby County Port Commission

Tennessee Department of Environment and Conservation

Tennessee State Historic Preservation Officer

Tennessee Wildlife Resources Agency

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CHAPTER 7

7. SUPPORTING INFORMATION

7.1. Literature Cited

Bailey, R. G. 1995. Description of the Ecoregions of the United States. United States Department of Agriculture, Forest Service. Miscellaneous Publication 1391.

Beard, L. M. 1989. Summary of Groundwater Data at Allen Fossil Plant. 1988. TVA Report WR28-2-38-100.

Betson, R. P., S. C. Young, and J. M. Boggs. 1986. Johnsonville Steam Plant – Assessment of Leachate Containment – Ash Pond D. TVA Report WR28-2-30-101.

Ernst, C. H., J. E. Lovich, R. W. Barbour. 1994. Turtles of the United States and Canada. Smithsonian Institution Press, Washington, D.C.

Etnier, D. A., and W. C. Starnes. 1993. The Fishes of Tennessee. University of Tennessee Press, Knoxville, Tennessee.

Ewert, M. A. 1976. Nests, Nesting, and Aerial Basking of Macroclemys Under Natural Conditions, and Comparisons With Chelydra (Testudines: Chelydridae). Herpetologica 32:150-156.

Federal Energy Management Agency. 1994. Shelby County, Tennessee, Flood Insurance Study. Dated December 2, 1994.

Federal Farmland Protection Policy Act. 1981. U.S. Code of Federal Regulations Title 7, Part 567. Amended in 1984 and 1994 (7 CFR Part 658).

Fisher-Phillips-Arnold, Inc. 1992. Master Plan of Development, Frank C. Pidgeon Industrial Area, Memphis, Tennessee. Dated March 1992.

Hall, Blake, and Associates, Inc. 1991. Hydrogeologic Report for Portions of Pidgeon Industrial Park - Memphis, Tennessee.

Hart, T. A. 1979. Geologic Map and Mineral Resources Summary of the Fletcher Lake Quadrangle, Tennessee (GM 404-SW and MRS 404-SW). State of Tennessee, Department of Conversation, Division of Geology.

LAWGIBB. 1999. Report of Subsurface Exploration, Proposed SCR Addition, Allen Fossil Plant.

Linzey, D. W. 1998. The Mammals of Virginia. The McDonald and Woodward Publishing Company, Blacksburg, Virginia.

Linzey, D. W.; C. Brecht. 2002. Southeastern Shrew. Wytheville Community College. Available at <http://www.discoverlife.org/nh/tx/Vertebrata/Mammalia/Soricidae/Sorex/longirostris/#> (date of access undetermined).

Nicholson, C. P. 1997. Atlas of the Breeding Birds of Tennessee. University of Tennessee Press.

Starnes, W. C., and D. A. Etnier. 1980. Fishes, Pages B-1 Through B-134 *in* D. C. Eager and R. M. Hatcher, editors. Tennessee's Rare Wildlife. Tennessee Department of Environment and Conservation, Nashville, Tennessee.

Tennessee Department of Environment and Conservation. 2002. Final Version Year 2002 303(d) List. TDEC, Nashville, Tennessee.

Tennessee Department of Environment and Conservation. 2004. Proposed Final Version: Year 2004 303d List. TDEC, Nashville, Tennessee.

Tennessee Valley Authority. 1981. Development of Additional Ash Disposal Environmental Assessment for the Bull Run Steam Plant.

Tennessee Valley Authority. 1989a. Development of Dredged Ash Disposal Area Environmental Impact Statement for the Johnsonville Fossil Plant.

Tennessee Valley Authority. 1989b. Development of Dredged Ash Disposal Area Environmental Assessment for the Paradise Fossil Plant.

Tennessee Valley Authority. 1990. Coal Combustion Byproduct Marketing/Utilization and Listing of Approved Uses Environmental Assessment and Finding of No Significant Impact.

Tennessee Valley Authority. 1991a. Allen Fossil Plant, Dewatering Active Ash Pond to Reclaim Ash Material for Ensley Berm Project Environmental Decision Record PR PROD 91-150.

Tennessee Valley Authority. 1991b. Amendment to Environmental Assessment - Coal Combustion Byproduct Marketing - Use of Fly Ash and Bottom Ash in Structural Fills for Residential or Commercial Structures Environmental Decision Record PR PROD 91-153.

Tennessee Valley Authority. 1996a. Development of Ash Disposal Capacity Environmental Assessment for the Paradise Fossil Plant.

Tennessee Valley Authority. 1996b. Sale of Permanent Easements and Temporary Construction Easements on TVA Tracts XALSP-2H and XALSP-3RR to the City of Memphis, Shelby County, Tennessee - Adoption of the Environmental Assessment Prepared by the U.S. Army Corps of Engineers, Memphis District, and Finding of No Significant Impact.

Tennessee Valley Authority. 1996c. Birmingham Steel Corporation Mini-Steel Mill and Memphis Shelby County Port Commission Harbor Project - Proposed Economic Development Loans and Direct Electrical Service - Adoption of the Environmental Assessment Prepared by the U.S. Army Corps of Engineers, Memphis District, and Finding of No Significant Impact.

Tennessee Valley Authority. 2000. Allen Fossil Plant Biogas Fuel Supplement Project Environmental Assessment and Finding of No Significant Impact.

Tennessee Valley Authority. 2001. Allen Fossil Plant Units 1, 2, and 3 Selective Catalytic Reduction Systems for Nitrogen Oxide Control Environmental Assessment, Revised Environmental Assessment, and Finding of No Significant Impact.

Tennessee Valley Authority. 2002. Development of Long-Term Ash Management Strategy, Johnsonville Fossil Plant, Kentucky Reservoir, Humphreys County.

Tennessee Valley Authority. 2004. Categorical Exclusion Checklist 7522, Allen Fossil Plant Temporary Ash Dredge Cell.

Tennessee Valley Authority. 2005. Categorical Exclusion Checklist 9555 Memphis Belz Structural Fill.

United States Department of Agriculture. 2004. Natural Resources Conservation Service. Soil Survey Geographic (SSURGO) database for Shelby County, Tennessee. Dated August 10, 2004. Available at <http://SoilDataMart.nrcs.usda.gov/> (date of access undetermined).

United States Environmental Protection Agency. 2000. Regulatory Determination on Wastes From the Combustion of Fossil Fuels. 65 Federal Register 32214, May 22, 2000.

United States Fish and Wildlife Service. 1989. Southeastern States Bald Eagle Recovery Plan. Atlanta, Georgia.

United States Geological Survey (USGS). 2002. National Seismic Hazard Mapping Project. Available at <http://www.geohazards.cr.usgs.gov/eq/index.html> (date of access undetermined).

University of Tennessee. Undated. Herbarium Web Site. Available at <http://www.tenn.bio.utk.edu/index.html> (date of access undetermined).

7.2. Abbreviations, Acronyms, Symbols, and Definitions

~	Approximately
AADT	Average Annual Daily Traffic
ALF	Allen Fossil Plant
APE	Area of Potential Effect
Aquifer	An underground bed or layer of earth, gravel, or porous stone that yields water
Aquitard	A geological formation of layers comprised either of clay, with tiny connected pores, or on nonporous rock that restricts water flow from one aquifer to another
BMP	Best Management Practice
CEC	Categorical Exclusion Checklist
CFR	Code of Federal Regulations
EA	Environmental Assessment
e.g.	Latin term, exempli gratia, meaning “for example”
EO	Executive Order
FWV	Free Water Volume
g	Acceleration due to gravity
I	Interstate Highway
Liquefaction	The sudden large decrease of the shearing resistance of a cohesionless soil, caused by a collapse of the structure by shock or strain, and associated with a sudden but temporary increase of the pore fluid pressure. It involves a temporary transformation of the material into a fluid mass.
mg/L	Milligrams per Liter
MRM	Mississippi River Mile
NEHRP	National Earthquake Hazard Reduction Program
NEPA	National Environmental Policy Act
NH_3-N	Ammonia Nitrogen
NOx	Nitrogen Oxides
NPDES	National Pollutant Discharge Elimination System

NRHP	National Register of Historic Places
PCBs	Polychlorinated Biphenyls
Port Commission	Memphis and Shelby County Port Commission
PM	Particulate Matter
SCR	Selective Catalytic Reduction
SR	State Route
TDEC	Tennessee Department of Environment and Conservation
TVA	Tennessee Valley Authority
TWRA	Tennessee Wildlife Resources Agency
US	U.S. Highway
U.S.	United States
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VOC	Volatile Organic Compound
yd^3	Cubic Yard

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APPENDIX A - TENNESSEE HISTORICAL COMMISSION CONCURRENCE LETTER

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TENNESSEE HISTORICAL COMMISSION
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
2941 LEBANON ROAD
NASHVILLE, TN 37243-0442
(615) 532-1550

August 25, 2005

Mr. J. Bennett Graham
Tennessee Valley Authority
400 W. Summit Hill Drive
WT 11D - Cultural Resources
Knoxville, Tennessee 37902

RE: TVA, ARCHAEOLOGICAL ASSESSMENT, ASH DISPOSAL/ALLEN FOSSIL PLANT, UNINCORPORATED, SHELBY COUNTY, TN

Dear Mr. Graham:

At your request, our office has reviewed the above-referenced archaeological survey report in accordance with regulations codified at 36 CFR 800 (Federal Register, December 12, 2000, 77698-77739). Based on the information provided, we concur that the project area contains no archaeological resources eligible for listing in the National Register of Historic Places.

If project plans are changed or archaeological remains are discovered during construction, please contact this office to determine what further action, if any, will be necessary to comply with Section 106 of the National Historic Preservation Act.

Your cooperation is appreciated.

Sincerely,

Herbert L. Harper
Executive Director and
Deputy State Historic
Preservation Officer

HLH/jmb